Vol. 18. Parts 1–2. Pp. 1–35. February 18th, 1949

THE PROCEEDINGS

OF THE

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Series B.

TAXONOMY

(being the continuation of Stylops)

World List abbreviation: *Proc. R. ent. Soc. Lond.* (A)

CONTENTS

	PAGE
Uvarov, B. P., C.M.G., D.Sc. A new *Pholidoptera* from S.W. Turkey (Orthoptera, Tettigoniidae)	1–2, 1 fig.
van Someren, Mrs. E. C. C. Ethiopian Culicidae — descriptions of four new mosquitoes from Madagascar.	3–8, 2 figs.
Mattingly, P. F. *Ficalbia* (*Ficalbia*) *jacksoni* sp. n., a new species of mosquito (Diptera, Culicidae) from Hong-Kong	9–11, 1 fig.
Balfour-Browne, J., M.A., F.Z.S., F.R.E.S. Notes on the subfamily Epimetopinae (Col., Palpicornia) with the description of a new genus and of three new species	12–18, 6 figs.
Richards, O. W., M.A., D.Sc. Parasitic Hymenoptera found in British houses, warehouses and ships. I: Ichneumonidae	19–35, 7 figs.
Book Notice	2

LONDON

PUBLISHED BY THE SOCIETY AND

SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7

Price 8s. 0d.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Founded 1833. Incorporated by Royal Charter 1885.

Patron—HIS MAJESTY THE KING.

OFFICERS AND COUNCIL FOR THE SESSION, 1949-1950

V. B. WIGGLESWORTH, M.A., B.Ch., M.D., F.R.S., *President.*

A. M. MASSEE, D.Sc.
W. H. THORPE, M.A., Sc.D. } *Vice-Presidents.*
C. B. WILLIAMS, M.A., Sc.D.

A. WELTI, *Treasurer.*

N. D. RILEY, *Secretary.*

H. OLDROYD, M.A., *Editor.*

Other Members of Council.

E. B. BRITTON, M.Sc.
C. L. COLLENETTE, F.R.G.S.
R. L. E. FORD, F.Z.S.
A. G. HAMILTON, B.Sc., B.Agr., Ph.D., D.I.C.
B. M. HOBBY, M.A., D.Phil.
H. B. D. KETTLEWELL, M.A., M.B., B.Chir., M.R.C.S., L.R.C.P.
C. W. MACKWORTH-PRAED.
J. A. SIMES, O.B.E.
T. H. C. TAYLOR, D.Sc.
A. J. A. WOODCOCK, M.Sc.

MISS E. EVANS, *Registrar.*

Finance and House Committee.

A. M. MASSEE, D.Sc. (Chairman).

C. L. COLLENETTE.
A. G. GABRIEL.
N. E. HICKIN, Ph.D.
CAPT. R. A. JACKSON, C.B.E., R.N.
F. VAN EMDEN.

Publication and Library Committee.

T. H. C. TAYLOR, D.Sc. (Chairman).

PROF. G. D. HALE CARPENTER, M.B.E., D.M.
J. W. EVANS, M.A., D.Sc.
A. G. HAMILTON, B.Sc., B.Agr., Ph.D., D.I.C.
G. E. J. NIXON, B.A.
J. SMART, B.Sc., Ph.D.
PROF. G. C. VARLEY, M.A., Ph.D.

Committee on Generic Nomenclature.

FRANCIS HEMMING, C.M.G., C.B.E. (Chairman).

W. A. F. BALFOUR-BROWNE, F.R.S.E.
K. G. BLAIR, D.Sc.
O. W. RICHARDS, M.A., D.Sc.
N. D. RILEY (Secretary).

Committee for the Protection of British Insects.

H. M. EDELSTEN, O.B.E. (Chairman).

R. B. BENSON, M.A., Mem. Hon. Soc. ent. Belg.
E. A. COCKAYNE, M.A., M.D., F.R.C.P.
R. L. E. FORD.
B. M. HOBBY, M.A., D.Phil.
CAPT. R. A. JACKSON, C.B.E., R.N.
COL. F. A. LABOUCHERE.
A. M. MASSEE, D.Sc.
THE HON. MIRIAM ROTHSCHILD.
N. D. RILEY (Secretary).

The Executive Officers of the Society are *ex-officio* members of all Committees.

DELEGATES OF THE SOCIETY TO :

1. **British National Committee for Biology** (Royal Society).
   Mr. Francis Hemming, C.M.G., C.B.E., appointed 1946.
   Dr. E. B. Ford, M.A., D.Sc., F.R.S., appointed 1949.
2. **Local Committee of Management of Wicken Fen.**
   Mr. H. M. Edelsten. O.B.E. (nominated by Committee for the Protection of British Insects).
3. **National Trust for Places of Historic Interest or Natural Beauty.**
   Mr. H. M. Edelsten, O.B.E., appointed 1944.
4. **New Forest Association.**
   Mr. C. W. Mackworth-Praed, appointed 1948.
5. **New Forest Joint Committee.**
   Mr. W. Fassnidge, appointed 1939.
   Dr. F. J. Killington, D.Sc., A.L.S., appointed 1939.
6. **Royal Meteorological Society. Phenological Committee.**
   Dr. C. B. Williams, M.A., D.Sc., appointed 1937.
7. **Council for the Promotion of Field Studies.**
   Dr. W. H. Thorpe, M.A., Sc.D., appointed 1944.
8. **Joint Bioclimatic Committee.**
   Dr. B. P. Uvarov, C.M.G., D.Sc., appointed 1945.
   Dr. C. B. Williams, M.A., D.Sc., appointed 1945.
9. **Yorkshire Naturalists' Trust, Ltd.**
   Mr. W. D. Hincks, M.P.S., appointed 1946.

A NEW *PHOLIDOPTERA* FROM S.W. TURKEY (ORTHOPTERA, TETTIGONIIDAE).

By B. P. Uvarov, C.M.G., D.Sc.

There are only two known species of *Pholidoptera* in which the male subgenital plate has no styli : *Ph. tauricola* Ramme 1930, from the Cilician Taurus, and *Ph. astyla* Ramme, 1927, from Naxos and Crete. A third species has now been discovered by Mr. P. H. Davis during his botanical explorations of S.W. Turkey and its description follows.

Pholidoptera tahtalica sp. n.

A relatively small species referable to the Group I characterized by the black last tergite in the male and to the sub-group of *krüperi-prasina-spinigera-*

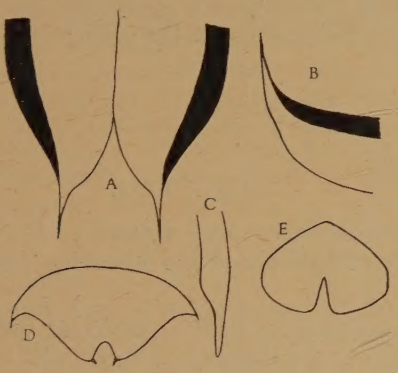


Fig. 1.—*Pholidoptera tahtalica* sp. n. A, male subgenital plate, ventral view ; B, *ditto*, lateral view ; C, male cercus, dorsal view ; D, male last tergite, dorsal view ; E, female subgenital plate, ventral view.

tauricola, with the male subgenital plate split into two very narrow recurved lobes (Ramme, 1939, *Mitt. zool. Mus. Berlin* **24** : 94).

♂ (*type*).—Pronotum as in the group. Elytra barely projecting beyond the pronotum. Hind legs relatively short and stout.

Last tergite rounded-trapezoidal, apically with two short rounded lobes, each of them extended below into an acute, stout spine. Cercus weakly incurved ; in the basal two-thirds stout, cylindrical, then suddenly narrowed on the inside so that the apical third is much more slender, finger-like. Subgenital plate elongate, narrowed posteriorly and deeply cleft into two strongly recurved pointed lobes, without any trace of the styli. Titillator paired, in the shape of two closely adherent, weakly recurved, tapering rods.

Coloration castaneous, with heavy black markings, as follows : Two oblong submedian vertical streaks and two large round spots on the face ; a curved line on each cheek ; orbits, antennal sockets and edges of fastigium ; broad postocular stripe ; posterior edge of the occiput ; lateral pronotal lobes except broad ivory-yellow lower margin ; very

narrow posterior edge of the pronotal disc; first and last abdominal tergite; lateral edges of subgenital plate; streaks and spots on the anterior and median femora and tibiae; a large upper basal spot, middle third portion and the apex of hind femur; base of hind tibia.

♀ (*paratype*).—Subgenital plate rounded, transverse, with an acutangulate posterior excision reaching the middle of the plate; inner angles of the lobes about 90°, rounded. Ovipositor very weakly recurved, longer than hind femur.

Length of body: ♂ 25, ♀ 24; pronotum ♂ 9, ♀ 10·5; hind femur ♂ 21, ♀ 22; ovipositor ♀ 27 mm.

S.W. Turkey: Tahtali Dagh above Kemer, Antalya (Adalia) vilayet, 1,700 m., sub-alpine scrub, 17.viii.1947, 2 ♂, 1 ♀ (*P. H. Davis*).

This species offers a curious mixture of characters found in others. The male last tergite is similar to that in *Ph. krüperi*; cercus is a variation of the type found in *Ph. spinigera*; subgenital plate is also as in *spinigera*, but with narrow recurved lobes and without any trace of the styli; female subgenital plate resembles that of *Ph. anatolica*, but its lobes are rectangular (all the above comparisons are made with the figures and descriptions by Ramme, 1930, *Mitt. zool. Mus. Berlin* **16**: 798–821; 1939, *t.c.* **24**: 94–109). On the whole, the new species finds its place near *Ph. spinigera*, the loss of the styli being connected with greater specialization of the subgenital plate.

Book Notice.

The Mites Associated with Stored Food Products. By A. M. Hughes. 8vo. London: Ministry of Agriculture and Fisheries, 1948. Pp. 168, 250 figs. Price 3s.

This work was undertaken to fulfil a particular difficulty encountered by the Infestation Division of the Ministry of Food in its work on pests of stored food, caused by the lack of information on the biology and systematics of mites.

The paper deals with the mites that live on stored food, with their mite predators and also with a number that feed on small fungi or are parasitic on insects and rats. In many cases the biology is unknown, but the author in her introduction expresses the hope that the descriptions given will form a framework on which more detailed systematic work can be based.

ETHIOPIAN CULICIDAE—DESCRIPTIONS OF FOUR NEW MOSQUITOES FROM MADAGASCAR

By Mrs. E. C. C. van Someren

(*Division of Insect-borne Diseases, Medical Research Laboratory, Nairobi, Kenya*).

Anopheles (Myzomyia) notleyi sp. n.

This mosquito belongs to the Group Neomyzomyia and the adult is very like *A.* (*M*) *flavicosta* Edwards, especially in the character of the wing markings, but it can readily be distinguished from this species by the broad scales on the scutum and by the leg markings.

Adult female.—*Head* with a large patch of broad white upright scales on the vertex and the frontal tuft long and white. Tori pale and the first flagellar segment of the antennae has a patch of white scales above. Palpi with three pale bands, the apical two broad and made up as follows: narrow apical pale bands on segments 2 and 3, apical two-thirds of fourth segment white, fifth segment all white. *Thorax*: Scutal integument grey with a fairly large dark spot on either side of fossae and a dark lateral line on either side on posterior half. Scutal scales broad and white anteriorly and at sides, yellow in middle posteriorly. *Legs* dark brown with pale markings. Fore legs—femora with a narrow pale line below on apical half of anterior surface; tibiae indistinctly pale at apex; first two segments of tarsi with narrow pale apical bands. Mid legs—femora with a narrow broken pale line down middle of anterior surface on basal two-thirds and there is a narrow sub-apical white patch; tibiae with a short pale line above just beyond base and very narrowly pale at tip; tarsi with only the first or first and second segments narrowly pale apically. Hind legs—femora with sub-apical pale patch below; tibiae with a narrow pale band apically; segments 1–4 of tarsi with distinct pale apical bands. *Wing* scales dark brown and creamy yellow. The four main dark areas on the costa very reduced, outer half mainly pale yellow and apical dark fringe spot absent. First vein as costa but sector spots present on first and second main dark areas; second vein with two dark spots on stem, one at base and one just before fork, upper and lower fork with two dark spots, one at base and one just before apex; third vein with two dark spots, one near base and one at about two-thirds; fourth vein with the distal half of the stem dark and the upper and lower forks are mainly dark with pale spots at fork and one on upper fork, about the middle; fifth vein with two small dark spots on stem, one at base and just before fork; upper fork dark with small pale spots before middle and at apex, lower fork with a large apical dark area; sixth vein with the apical half dark and one or two small dark spots near the base.

Male.—Palpi basal half of shaft rough with outstanding scales; the two distal pale areas very large and a basal pale ring present; stem dark. *Terminalia* (Fig. 1). Four parabasal spines, three in a row, the inner one shorter and stouter than the other two, and above this row one long stout spine which has a curved, finely tapered point. Harpago with a long slender club which is swollen at the tip, apical bristle long and slender (almost as long as the club), inner accessory hair almost as long as apical bristle. Phallosome with five short narrow leaflets on each side, one rather broader than the rest.

Pupa.—Very like *A. kingi* Christophers figured by Evans (1938), but differs as follows: Paddles rather long and narrow with the basal one-third of the external border bare and a fringe of long fine hairs which extends round the apex to about half way up the internal border; terminal hair long and curved at tip; accessory hair with 3–4 branches. C VI–VII as C III–V, fine and with many branches.

Larva (Fig. 2).—With shoulder hairs very like those of *A. cinctus* N. & C. and *A. dureni* Edwards, described and figured by Henrard, Wymeersch and Wanson (1944), but easily separated from either of these by the simple inner clypeal hairs.

Head.—Inner clypeal hairs long, simple, and dorsally and inwardly bent near the base ; outer clypeal hairs very short, less than one-fifth the inner and with 2–5 branches ; posterior hairs about the same length as the outer and with 3–4 branches which may be split again distally. Antennae sparsely spiculate and shaft hair very near base and very short and single. *Thorax :* Shoulder hairs with bases well separate but small ; inner hair about half the length of the outer and with a very flattened stem which has 5–6 dendritic, flattened branches ; inner stem flattened with about 8 branches on inside and 4 on outside. Thoracic

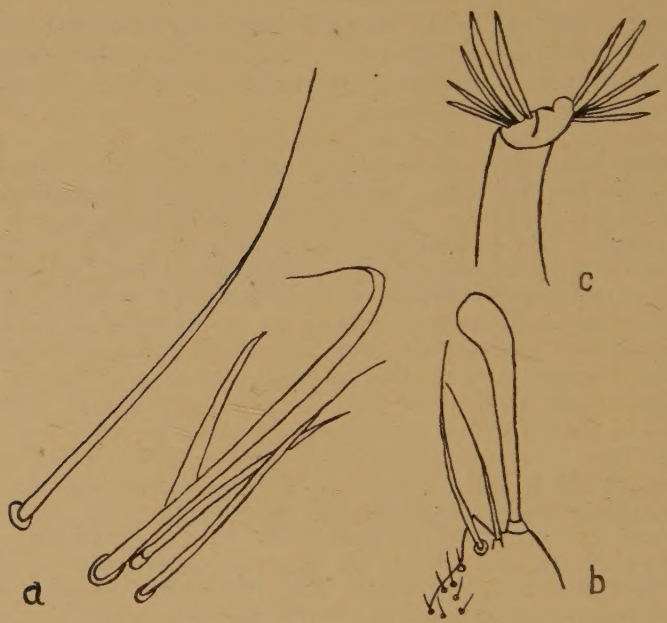
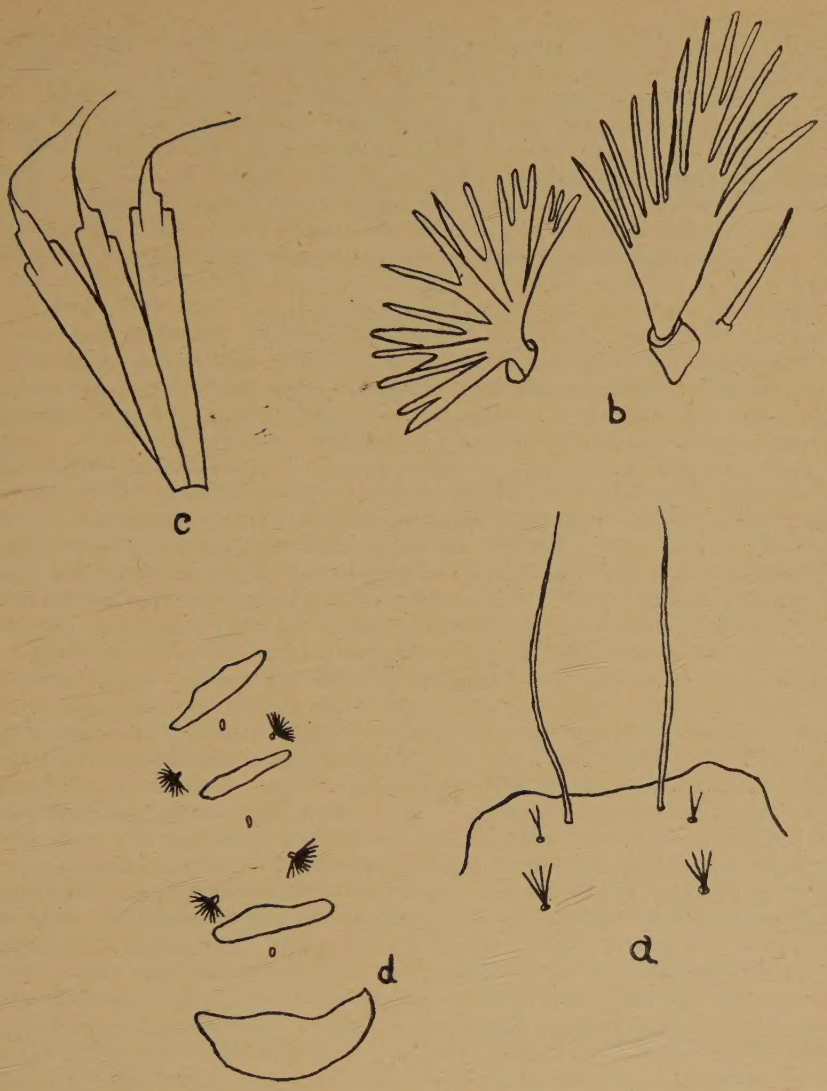


Fig. 1.—*Anopheles notleyi* sp. n. Male terminalia. *a*, Parabasal spines ; *b*, Harpago ; *c*, Phallosome.

palmate hair tassel-like with about 12–14 shoulderless leaflets. Meso- and metapleural hairs single with one of each group bifid distally.

Abdomen.—Palmate hairs ; 1 smaller than on following segments, but with about 14 narrow shouldered leaflets which have long fine filaments ; fully developed on II–VII, IV–V large and with 17–21 broad leaflets with squarely indentate shoulders and a long fine filament which is about half the length of the blade. Pecten with the teeth spiculate and with the short and long teeth usually arranged alternately but occasionally 2 short teeth together. Saddle hair with about 8 branches. Tergal plates broad but shallow on I–VII and that on VIII broad and deep ; only one accessory tergal plate present.

Described from holotype, allotype and 5 paratypes, 5 larval and 3 pupal pelts from Sakaramy, near Diego Suarez, Madagascar.



2

FIG. 2.—*Anopheles notleyi* sp. n. Larva. *a*, Clypeal hairs ; *b*, shoulder hairs ; *c*, leaflets of abdominal palmate hair ; *d*, abdominal tergal plates.

Orthopodomyia vernoni sp. n.

Differs from the Ethiopian member of this genus, *O. arboricollis* d'Emmerez de Charmoy, and from similar Indian species, by having only basal pale markings on the hind tarsi and by having a small patch of erect scales at tip of mid-femora below.

Female unknown.

Male.—Head : The vertex is covered with white decumbent scales in front and yellowish ones behind ; upright scales mainly black but a few white ones in front. Tori with white scales and first 5 flagellar segments of antennae with long narrow white scales. Palpi dark, as long as proboscis, and with four white marks ; one at base, middle, and apex of the shaft, and ultimate segment all white. Proboscis dark with a creamy white line above on basal half, a pale band in middle and a yellow band at tip. *Thorax :* Scutum covered with narrow white, yellow, and dark brown scales forming an indefinite pattern as follows : A patch of brown scales in the middle in front with yellowish scales on either side ; a dark brown patch about middle of scutum and two posterior lines of brown scales on either side of and extending beyond bare space, outside and round these dark areas whitish scales ; a patch of yellow scales immediately in front of bare space and two short white lines on either side just in front of mid-lobe of scutellum. Scutellum with broad but long white scales. Sternopleurae and upper mesepimeron with patches of broad white scales ; *apn* with broad pale scales below and narrow yellow scales above ; *ppn* with pale scales, narrow and yellow above, broader and creamy white below ; prosternum, propleurae and front coxae covered with broad creamy white scales. *Abdomen* dark brown. Tergites 2–7 with small basal lateral creamy white patches and with sub-basal median dorsal pale markings on segments 2–6 ; tergite 8 with a narrow basal pale band and small apical lateral pale spots. Sternites mainly dark with narrow pale basal bands. *Legs* dark brown with creamy white markings. All femora dark with narrow pale knee-spots, a narrow line of yellow scales posteriorly, and scattered pale scales which, on mid femora, tend to form subapical bands ; fore femora broadly pale all round at base and mid femora with a small tuft of dark erect scales below at apex. All tibiae pale below, dark above and at sides, with scattered pale scales in dark areas, and narrow apical pale bands ; mid and hind tibiae with narrow basal bands and indistinct sub-basal pale bands. Fore tarsi dark except for a narrow white ring at the base of first segment; mid tarsi narrowly pale at base of segments 1–3, rest all dark ; first segment of hind tarsi with a few pale scales at base, second with a broad basal white band, and basal half of third and fourth white all round, fifth all dark or with a few white scales basally. *Wings* with broad dark brown and creamy white scales patterned as follows : Costa with two broad white patches at base, a white patch on either side of middle and a faint one at tip. First vein with white patches as on costa except that underneath the fourth white patch on costa the first vein has an area of scattered light and dark scales. Second vein with a white patch on stem at base and the middle, a white patch at fork and a white patch at tip of upper fork. Third vein with a broad pale patch at tip and middle and a small pale spot at base. Fourth vein with a large white patch at middle of stem, two smaller ones just before fork and white patches at base and tip of both upper and lower forks. Stem of fifth vein dark with a white patch at base and scattered light and dark scales on distal half, upper fork with pale patches just beyond base, at middle, and apex ; lower fork with a pale patch at apex. Sixth vein with a large pale patch at middle and a small pale area at either end. Terminalia not examined.

Described from holotype from Sakaramy, near Diego Suarez, Madagascar.

Larva.—The larva is not certainly known, but as the larva described here was taken from a tree hole in Sakaramy it probably belongs to this species.

It is very like *O. arboricollis* as described by Hopkins (1935), but differs in the arrangement of the head setae and by having the subventral tuft at a half.

Head.—Antennae about half the length of the head, straight and swollen on basal half; tuft at one third and with 3–5 plumose branches. Setae A, B, C and *d* are placed about the mid line of the head ; all are large and with many plumose branches ; *d* slightly shorter than the others. A, B and *d* with their bases almost in a straight line, C out of alignment, below, and mid way between B and *d* ; *e* and *f* long and plumose, *e* single, *f* with

2–3 branches. *Thorax* with stellate setae. *Abdomen :* Integument covered with small sclerotized plaques and with many stellate setae. Comb a double row of long sharp-pointed spines which have a few fine basal denticles ; spines of proximal row more numerous than distal row and slightly shorter. Siphon slightly swollen in the middle, with an index of about 5 in mounted specimens ; no pecten present ; subventral tuft at a half, mounted on a small tubercle, and with 10 plumose branches which are one and a half times the diameter of the siphon. Lower caudal seta single ; upper with many branches. Lateral seta long with 2 simple branches. " Gills " very short.

Breeding in tree holes, Sakaramy, near Diego Suarez, Madagascar.

Aëdes (Finlaya) phillipi sp. n.

The thoracic pattern of this species is very like that of *A.* (*F*) *pulchrithorax* Edwards and *A.* (*F*) *barnardi* Edwards, but the all-dark tarsi will readily distinguish it from either of these.

Adult female unknown.

Male. Head covered with broad flat dark scales above with a narrow line of silvery white scales round eye margins and a small white spot on nape. Tori dark and bare. Palpi and proboscis all dark and palpi shorter than proboscis. *Thorax :* Scutal scales narrow, mainly black but with three narrow ragged lines of narrow yellow scales arranged as follows : a median line running the full length of the scutum and forking round the bare space, two lateral lines running from in front of scutellum to near front margin. There is a small patch of broad flat silvery white scales in front of wing roots and the *apn* and *ppn* have broad silvery white scales. Sternopleurae and mesepimeron with patches of broad silvery scales. Scutellum with broad silvery scales on mid lobe, broad black scales on lateral lobes. *Legs :* Fore and mid femora dark with a narrow whitish line below and mid femora sometimes with a narrow line of silvery white scales on apical one-third of anterior surface ; hind femora dark all round on apical half and with a narrow dark dorsal line to base ; basal half of posterior and anterior surfaces pale ; pale basal half of anterior surface continued in a narrow median silvery line to near tip. All tibiae and tarsi dark, no white markings. Abdomen dark and with large silvery white basal lateral spots on tergites 1–7 and small median basal spots on segments 5–8. Sternites dark with basal white bands. *Terminalia :* Style long, narrow, slightly tapered, curved at tip, and with a long narrow terminal spine. Coxite long, narrow, and with a slight basal lobe covered with a number of fairly long hairs ; harpago with a long slender appendage which is sharp pointed ; ninth tergite with small lateral lobes which each bear 3–4 fairly long fine bristles.

Described from holotype and 14 paratypes from Sakaramy, near Diego Suarez, Madagascar.

Aëdes (Finlaya) madagascarensis sp. n.

This species appears to be very like the Ethiopian species *A.* (*F*) *barnardi* Edwards (*ex* description) but can be readily separated from this species by having two large patches of dark scales on the head above, and by the white scales on the tori.

Adult. Female.

Head.—Decumbent scales all broad, flat and mainly dark, white areas as follows : Two large patches of white scales divided by a narrow black band on either side, a narrow white line round eye margins in front, and two median white lines which are widely separated in front and meet in a point behind. There are a few upright scales on nape. Tori dark with small, broad, flat, white scales on inner, lower, and outer surfaces. Clypeus, palpi, and

proboscis dark; palpi about one quarter the length of the proboscis. *Thorax:* Scutum covered with narrow dark brown and creamy white scales which form a pattern as follows: A band of creamy white scales round margin; lateral posterior white lines on each side which reach to middle of scutum and then curve outwards to reach scutal margin just in front of scutal angle; white scales round bare space in front of scutellum; middle of scutum rubbed but there is at least one and probably two median white lines running the full length of the scutum. Scutellum with broad dark scales on lateral lobes and in the middle of the mid lobe; a line of broad white scales on either side of mid lobe continuing the white lines round bare space of scutum. Paratergites, *apn* and *ppn* with broad flat white scales. Patches of broad white scales on sternopleurae, mesepimeron, and coxae. *Abdomen* is rubbed but with dark brown scales and basal white lateral patches present on at least tergites 1–5 and small pale median basal spots on tergites 3–5. Sternites dark with broad white basal bands. *Legs:* Fore and mid femora dark with a narrow white stripe beneath for full length and mid femora with a narrow pale knee-spot. Hind femora with a narrow dark dorsal line to near base, the anterior surface white on basal half and the white area continued in a point to two-thirds; apical half dark and a narrow pale knee-spot which is extended back below to one-third; posterior surface with the basal half white, apical half dark and narrow pale band at tip. All tibiae dark. Fore tarsi dark with a narrow pale basal band on first segment only; mid tarsi with fairly broad white bands on the first two tarsal segments; hind tarsi with a broad white basal band on the first segment, second segment with more than the basal half white, segments 3–5 missing.

Male unknown.

Described from holotype from Sakaramy, near Diego Suarez, Madagascar.

Acknowledgements.

I have to thank Major Vernon van Someren, Major F. B. Notley and Captain Phillip Glasgow, of the 23rd Mobile Malaria Section, E.A.A.M.C., for a large collection of mosquitoes from Madagascar, among which were the four new species described here.

References.

Evans, A. M., 1938, *The Mosquitoes of the Ethiopian Region* **2**.

Hopkins, G. H. E., 1935, *ibid.*, **1**.

Henrard, C., Wymeersch, H. van, Wanson, H., 1944, Description de la larve et de la nymphe de *L'Anopheles dureni* Edw. *E. Afr. Med. J.* **21**: 266–269.

FICALBIA (*FICALBIA*) *JACKSONI* SP. N., A NEW SPECIES OF MOSQUITO (DIPTERA, CULICIDAE) FROM HONG-KONG.

By P. F. Mattingly.

Ficalbia (Ficalbia) jacksoni sp.n.

Adult.—Differs from all the other known members of the sub-genus in the markings of the abdomen and hind femur. Intermediate with respect to the length of the first flagellar segment of the ♀ antenna between *F. uniformis* Theo. and *F. minima* Theo. on the one hand and *F. nigra* Theo. and *F. circumtestacea* Theo. on the other.

Female.—Wing length about 2 mm. *Head* with decumbent scales of vertex broad, flat, pale brownish. Upright forked scales dark brown, restricted to nape. Palps and proboscis dark brown, the latter markedly swollen at the tip. Palpi minute, not much longer than the clypeus. Proboscis about as long as or slightly longer than the abdomen. Antennae with the first joint of the flagellum about 4× as long as the second. *Thorax* with scutal integument dark brown and shiny. A sparse covering of narrow, curved, black or very dark brown scales on the mesonotum. Dorsocentral bristles long and strong. Acrostichals shorter. Pleurae yellowish, darkened anteriorly. Wings with the veins clothed with broad dark scales. Upper fork cell about 1·7× as long as its stem. Halteres whitish with the knobs dark brown. Legs dark. Hind femur pale below and posteriorly and with a very conspicuous pale knee-spot about twice as long as broad. A small and relatively inconspicuous pale spot present at the apex of the tibia. *Abdomen* clothed with broad flat scales. Tergites dark with indistinct pale basal lateral triangles. Sternites pale with continuous dark apical bands.

Male.—Resembles *F. minima* and differs from the other species of the sub-genus in the very short palps. Proboscis very strongly swollen apically. Palps minute, much as in the female. Other external characters as in the female. The terminalia will be dealt with in a later communication together with those of the other members of the sub-genus, none of which have as yet been described.

Pupa.—Closely resembles that of *F. uniformis*, appearing to differ mainly in the simple apical paddle hair. *Trumpets* moderately long, slender, the basal half tracheoid. Meatus rather less than half the total length. Dorsal seta tuft-like, situated behind and between the trumpets, much as in *uniformis* but larger. *Abdomen* much as in *uniformis*. Setae " B " and " C " with about 14 branches on segment II, decreasing to about 7 on segment VI. All setae on VII and VIII small and inconspicuous. *Paddles* rather small and pear-shaped, infuscated at the base. Outer edge with coarse spines for about two-thirds the distance from the apical bristle to the base. Inner edge bare. Apical bristles simple.

Larva (fig. 1).—Differs from that of *uniformis* in having a comb composed of scales and in the possession of a single pecten spine and from *minima* in the shape of the antenna, relatively simple pre-clypeal spines and more delicate and more numerous comb scales. *Head* broader than long, dark brown with a broad pale band running from side to side across the middle (visible only in cast skins). Antenna brown with a dark ring at the base. Shaft long, slender, curved, spiculated, slightly thickened near the middle. Antennal tuft with 6–9 branches, situated at about 4/5 the distance from the base. Apical and pre-apical bristles arising closer together even than in *minima*. Pre-clypeal spines long, dark, with a conspicuous secondary denticle on the inner aspect near the base. Bases of setae "A," " B " and " C " in a straight line. The distance between the bases of " B " and " C " about 3/5 that between "A" and " B." Base of seta " d " inside and anterior to that of " C." Seta "A" with 10–15 sub-plumose branches, " B " with 2, both very long, " C " with 8–11, " d " small and 4-branched. *Thorax* with a number of large stellate

Fig. 1.—*Ficalbia jacksoni* sp. n. Larva. *a*, Head; *b*, terminal segments.

setae on the dorsal surface. Certain of the shoulder hairs and pleural hairs very long, up to 3× the length of the head or more. *Abdomen* with a row of stellate setae dorsally on the posterior margin of each of the first 7 segments. Comb of about 12 long, narrow, delicately fringed scales. Siphon with a single simple pecten spine at the base immediately below the siphonal tuft. The latter more than half the length of the siphon with 6–9 branches. Siphonal valves large. Siphonal index about 3. Anal segment with the lateral seta split into about 6 frayed branches. Upper (inner) caudal seta with about 3 short branches near the base, beyond which the shaft divides into about 6 very long branches. Lower (outer) caudal seta with the main stem very long and 2–3 shorter branches arising near the base. Margin of anal segment without spicules. As far as can be seen the " gills " are short and pointed in mounted specimens.

Breeding-places.—The record of the breeding-place of the type male was lost together with all other records of the Malaria Bureau, Hong-Kong, as a result of enemy action. The allotype and two paratype females came from a grassy hill-side swâmp, adjoining the seaside village of Shek O on Hong-Kong Island.

Types.—Holotype-paedotype ♂ bred out Hong-Kong, China, 3.v.1935 (*R. B. Jackson*). Allotype ♀ bred out Hong-Kong, China, 23.x.1946 (*R. B. Jackson*). Both types now in the British Museum.

The type ♂ is accompanied by a liaison larval pelt and one paratype ♀ by liaison larval and pupal pelts. In addition to these the paratype material includes 4 larval and one pupal pelts, not individually associated, but bearing the same data as the paratype adults.

Literature.

Barraud, P. J., 1934, *Fauna of British India.* Culicidae. *Tribes Megarhinini and Culicini.* London.

Bohart, R. M., 1946, *A Key to the Chinese Culicine Mosquitoes.* Bur. Med. and Surg., Navy Dept., Washington, D.C.

Edwards, F. W., 1932, *Genera Insectorum. Fam.* Culicidae. Bruxelles.

——, 1941, *Mosquitoes of the Ethiopian Region* **3**. *Culicine Adults and Pupae.* London : Brit. Mus. (N.H.).

Hopkins, G. H. E., 1936, *Mosquitoes of the Ethiopian Region* **1**. *Larval Bionomics and Taxonomy of Culicine Larvae.* London : Brit. Mus. (N.H.).

Wigglesworth, V. B., 1929, The early stages of some West African Mosquitoes. *Bull. ent. Res.* **20** : 59–68.

NOTES ON THE SUBFAMILY EPIMETOPINAE (COL., PALPICORNIA) WITH THE DESCRIPTION OF A NEW GENUS AND OF THREE NEW SPECIES.

By J. Balfour-Browne, M.A., F.Z.S., F.R.E.S.

(*British Museum, Natural History.*)

The subfamily Epimetopinae has been regarded as consisting of but a single genus, *Epimetopus* Lacordaire, with nine species, four Indian and five American (southern states of United States to northern South America). This peculiar distribution is closely paralleled also in the subfamily Hydrobiinae, the genus *Oocyclus* Sharp having three species from China, Sumatra and Ceylon and five species in South America.

A previous attempt has been made to divide *Epimetopus* by Schwarz and Barber (1919, *Proc. ent. Soc. Wash.* **19** : 131) who suggested that the Asiatic species placed in *Epimetopus* appeared not to be congeneric with the American species of the same genus, " apparently having a different type of pronotal lobe and more pronounced elytral tubercles with metallic lustre."

d'Orchymont (1933, *Bull. Ann. Soc. ent. Belg.* **73** : 287), in my view correctly, points out that the difference in the pronotal lobe is more apparent than real and suggests that the tubercles of the Asiatic species are almost certainly the equivalents of the alternate costae of the American species. On these grounds he rejects the division of the genus.

Whilst I find myself in general agreement with d'Orchymont in rejecting the proposals of Schwarz and Barber to divide the genus on the grounds adduced, it appears to me that there are, nevertheless, adequate grounds for making a division of the genus which actually accords with the known geographical distribution. In the course of study of the material in the British Museum for comparison with the three new species described below it was noted that, in the three Indian species available, *bullatus* (Sharp), *flavidulus* Sharp and *asperatus* Champion, the anterior coxal cavities are open behind, and that the metasternum has a transverse tripartite glabrous and highly polished raised tabella along the posterior edge, the rest of the surface being finely alutaceous. On the other hand, in the North American species *costatus* (Le Conte) and *thermarum* Schwarz and Barber, and the South American species *trogoides* (Sharp) and *lacordairei* Orch. (according to description) the anterior coxal cavities are closed behind and there is no sign of a raised glabrous tabella on the metasternum, the whole surface being finely granulose on a fine alutaceous ground sculpture. These characters are also to be found in the three new neotropical species described hereafter. The very important character of the condition of the anterior coxal cavities appears not to have been seen before and leaves no possibility of doubting that, even alone, but much more strongly when taken in conjunction with the character of the condition of the metasternum and the tuberculate or costate alternate elytral intervals, we have here a truly generic distinction. The strong superficial similarity of the oriental and American species suggests a monophyletic ancestry for the subfamily, but it is evident that this ancestry must be in an

extremely remote geological past. The condition of the anterior coxal cavities might even be accorded a status higher than generic but it appears not to serve any useful purpose to attempt to substantiate this for two numerically insignificant genera.

The following dichotomic key summarizes the generic distinctions :

A. Elytra without longitudinal costae but with four more or less distinct series of tubercles on the 2nd, 4th, 6th and 8th interstriae ; anterior coxal cavities open behind, prosternum short ; metasternum without glabrous granules but with a posterior, very transverse, highly glabrous tripartite tabella on a minutely alutaceous ground sculpture . . . . . **Eumetopus** gen. n.

A′. Elytra with four continuous longitudinal costae on the sutural, 2nd, 4th and 6th interstriae and an incipient costa on the 8th interval about one-third of the length from the base ; anterior coxal cavities closed behind, prosternum rather long ; metasternum without a highly glabrous transverse tabella but with numerous, irregular highly glabrous tubercles on a minutely alutaceous ground sculpture. *Epimetopus* Lacordaire.

Epimetopus Lacordaire was proposed as a new name for the preoccupied name *Ceratoderus* Mulsant, 1851 (*nec* Westwood, 1841). The genotype must therefore be *Ceratoderus graniger* Mulsant, described from Colombia, by monotypic designation. A further name, *Sepidulum* LeConte, was proposed for the American species *costatum* LeConte, and it will remain as a synonym of *Epimetopus* on the present division of the genus. There is, therefore, no existing name available for the Asiatic species here regarded as of generic status, and I propose the name *Eumetopus*, and select as the genotype *Sepidulum bullatum* Sharp (1874).

Five species of *Epimetopus*, as here restricted, have been described to date : *graniger* (Mulsant, 1851), *costatus* (LeConte, 1874), *trogoides* (Sharp, 1874), *thermarum* Schwarz and Barber (1919) and *lacordairei* Orch. (1933). Three further species, *vianai* sp. n. (Argentine), *hintoni* sp. n. (Bolivia) and *angulatus* sp. n. (Bolivia) are described below. The genus is readily divided into two groups, according as to whether the eye is wholly or only partially divided by a canthus. *E. trogoides* (Sharp), *thermarum* Schwarz and Barber and *vianai* sp. n. belong to the first group, the remaining five species to the second group. I have not seen either *graniger* (Mulsant) or *lacordairei* Orch. and have been unable to include them in the subjoined key to the genus on the published characters alone.

1. Eyes completely divided by a canthus . . . . . 2.
1′. Eyes only about half divided by a canthus . . . . . 4.
2. Pronotal lobes more widely rounded, almost unmargined ; the anterolateral expansions of the pronotum very prominent and more flattened, extending well behind the middle of the edge, distinctly deeply emarginate at about the middle, irregularly finely crenulate ; median marginate elevation with the sides sharp, carinate anteriorly and anteriorly convergent, posteriorly continued by large granulosities first in a convergent, then in a basally divergent costa ; sublateral longitudinal costae distinct, carinate, shallowly interrupted at middle (?) (Brazil). . . . . *trogoides* (Sharp)

2′. Pronotal lobe more acutely rounded, distinctly but finely margined; antero-lateral expansions less prominent, less flattened, not extending much behind the middle and regularly attenuated to the base from the widest point, the expansion not distinctly or deeply emarginate; median marginate elevation strong, distinctly but finely canaliculate anteriorly and appearing geminate, distinctly convergent anteriorly, posteriorly continued as an indistinct sinuate, granulate, fairly broad costa; sublateral costae not very distinct, rounded, not carinate . . . . . 3.

3. Granulosities of the fronto-clypeus very weak and sparse, only a few near the posterior median angle; anterior edge of the fronto-clypeus in the male weakly produced and distinctly upturned into a very obtuse process; intercostate areas of the elytra indistinctly and obsoletely granulate at the base; elytra mainly griseous with a shallow V-shaped post-median rufescent discal band and dirty griseo-testaceous apically (Argentina). . . . . **vianai** sp. n.

3′. Granulosities of the fronto-clypeus close and dense, moderately strong; anterior edge of the fronto-clypeus of the male smooth, simple, not at all produced or upturned; intercostate areas of the elytra distinctly but finely granulate to at least half the length of the elytra from the base; elytra rather more brightly coloured, the base widely blackish, a shallow V-shaped median rufescent discal transverse band scarcely delimited behind from the rufescent apical portion (Arizona, Mexico) . . . . . *thermarum* Schwarz and Barber.

4. Colour griseous without any traces of a distinct rufescent banding on the elytra apically; explanate portion of the pronotum prominent with a distinct, sharply produced anterior angle; median marginate elevation with a distinctly but finely impressed anterior sulcus, rendering the margin geminate, the posterior sinuate granulate costae quite indistinct; intercostate areas of the elytra with scattered fine granulosities in the basal half (Bolivia). **angulatus** sp. n.

4′. Head blackish, pronotum and elytra rufous, without trace of black; explanate portion of the pronotum without a distinct anterior angle; median marginate elevation delimited by an anteriorly and posteriorly convergent rounded granulate costa, not distinctly canaliculate except at the extreme anterior point; intercostate areas of the elytra without scattered granulosities, at most with regular elongate low tubercles on the intervals between the serial punctures 5.

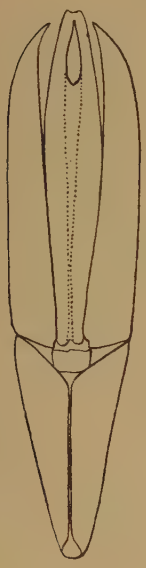
5. Pronotal lobe more broadly rounded, lateral lobes more rounded; elytral striae on the disc with distinct large punctures separated by a space half or less than half their diameters and with only a weak tendency for the intervals to be granular, more distinct near the shoulder (Texas, Mexico, Guatemala) . . . . . *costatus* (LeConte).

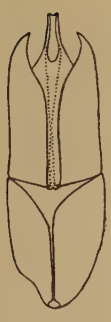
5′. Pronotal lobes more sharply rounded, the lateral lobes less smoothly rounded, slightly angulate; elytral striae on the disc with small, not very distinct punctures separated by a space at least equal to their diameters, the intervals evidently with elongate granules even near the apex (Bolivia) . . . . . **hintoni** sp. n.

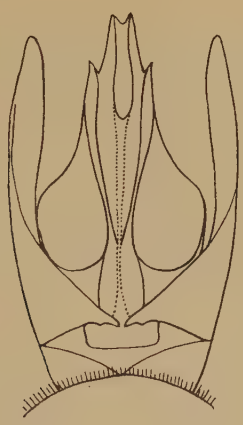
Epimetopus vianai sp. n.

Black, the apex of the elytra widely and a discal V-shaped median band rufescent; the eyes completely divided by a canthus.

Head black, granulosities of the fronto-clypeus rather sparse and somewhat obsolete ; labrum smooth and shining ; eyes small, oval above, with a fine costate ridge at the middle of the internal margin, entirely divided by a canthus ; maxillary palpi shorter than the antennae, second and fourth segments subequal, 4th subulate ; anterior edge of the clypeus







FIGS. 1–6.—(1) *Epimetopus trogoides* (Sharp), Aedeagus, dorsal aspect. (2) *Epimetopus thermarum* S. & B., Aedeagus, dorsal aspect. (3) *Epimetopus vianai* sp. n., Aedeagus, dorsal aspect. (4) *Epimetopus angulatus* sp. n., Aedeagus, dorsal aspect. (5) *Epimetopus hintoni* sp. n. Aedeagus, dorsal aspect. (6) *Epimetopus costatus* (LeConte). Aedeagus: (*a*) ventral, (*b*) dorsal aspect.

of the male strongly margined and strongly upturned, particularly in the middle, in the female simple. *Antennae* 9-segmented (6+3), scape long, somewhat flattened and weakly inflated near the apex, distinctly longer than the flagellum and club taken together; 2nd segment globular, 3rd to 6th very transverse; segments of the club unequal, 3rd segment enlarged, as long and twice as wide as the two basal segments taken together. *Pronotum* black, slightly wider than long, the anterior pronotal lobe very finely margined, the anterior angles obtuse but moderately prominent, with a lateral, roundly angulate expansion about the middle, from the widest point to the base regularly attentuate, the posterior angles subrectangular; disc anteriorly with a shallow median longitudinal sulcus, delimited on each side by a weak costa, the costae finely canaliculate, from in front towards the base at first weakly divergent, then strongly convergent and contiguous, then abruptly divergent, the costae becoming obsolete towards the base; general surface irregularly densely granulose. *Scutellum* very small. *Elytra* black or griseous at the base, at the middle with a V-shaped narrow band and the apex widely rufescent; strongly convex, attentuate rounded behind; with ten longitudinal series of large deep punctures, the intervals half or less than half the diameter of the punctures; the sutural, 2nd, 4th and 6th interseries sharply longitudinally costate, the 4th widely interrupted at one-quarter of the length from the base; the costae very obsoletely granulose; the 8th interseries with several large longitudinal granulosities about the middle; the 1st, 3rd and 5th interseries very sparsely granulose near the base; the humeri moderately prominent and strongly granulose; epipleurs wide to the apex. *Venter* black, the apical ventrites rufescent; mentum smooth and shining, finely sparsely punctulate; procoxae contiguous; mesosternum with a transverse carina in front of the intercoxal process; metasternum finely granulose, the granulosities shining; ventrites 1 to 4 closely, very densely, very finely and sharply punctulate, apparently glabrous; 5th ventrite similarly punctulate only in the basal half in the middle, otherwise smooth and shining. *Legs* piceo-rufescent, trochanters smooth, the femora with a few large tubercles towards the apex; tibiae longitudinally regularly spinulose; tarsi very short, claws simple.

Size: 2·618–2·926 mm. long., 1·232–1·463 mm. lat.

Holotype ♂, Argentina: Cordoba; Dep. de Calamuchita, "El Sauca," xii.1938 (*Manuel J. Viana* coll.).

Paratype: 1 ♀, same particulars as holotype.

This species is very similar indeed to *thermarum* Schwarz and Barber, resembling it both in size, form and colour and the aedeagi of these two species (figs. 2, 3) are very similar. *E. vianai* has, however, a sexual dimorphism of the clypeus which is not mentioned by Schwarz and Barber, nor is it present in a pair of co-types before me, the anterior pronotal angles are obtusely prominent, not rectangularly prominent; the elytral interseries are only obsoletely granulose at the base and the punctulation of the ventrites is much more distinct and rather denser.

Epimetopus angulatus sp. n.

Black or griseous, strongly convex, widely oval, narrower in front, broadly rounded behind; eyes only partially divided by a canthus.

Head small, entirely finely granulose, the tubercles rather coarser on the frons; eyes seen from above longitudinally ovate, about half divided by a canthus anteriorly; maxillary palpi elongate, the second segment almost as long as the 3rd and 4th taken together, 4th segment subulate. *Antennae* short, 9-segmented (6+3), the scape elongate, as long as the flagellum and club taken together, slender, slightly inflated before the apex, 2nd segment globular, 3rd to 6th transverse; segments of the club unequal, the 3rd segment as long as the two basal segments taken together and wider than the second. *Pronotum* almost as long in the middle as wide at the widest point, the anterior lobe strongly produced

and overlapping the head up to the level of the anterior margin of the eyes, entire, finely but distinctly margined, somewhat rugose ; the anterior angles prominent, at the sides rather before the middle a lateral angulate expansion and from the widest point to the base almost regularly attenuate, the posterior angles rectangular ; middle of the disc anteriorly with a shallow longitudinal sulcus, bounded on each side by a weakly costate ridge, canaliculate on the summit, the costae weakly divergent in an antero-posterior direction and fading out before the middle ; the general surface finely granulose. *Scutellum* very small. *Elytra* convex, widely rounded behind, the margins moderately explanate, particularly about the middle, with ten series of moderately large but quite shallow punctures not impressed in striae, the punctures separated by a space approximately equal to their diameter, the interseries finely, rather sparingly and rather obsoletely granulate, as are the intervals between the serial punctures ; sutural, 2nd, 4th and 6th interseries quite weakly but distinctly longitudinally costate, the 4th somewhat widely interrupted at about one-quarter of the length from the base, the 8th interseries with a short rudimentary costa at about one-third of the length from the base ; epipleurs wide right to the apex, the basal half and inner and outer margins obsoletely granulose. *Venter* black, mentum excessively finely reticulate, hardly shining ; the anterior coxae contiguous, the coxal cavities closed behind ; mesosternum finely transversely carinate just in front of the intercoxal process ; metasternum evenly finely granulose, the tubercles highly nitid ; ventrites apparently glabrous, 1st to 4th closely and very densely, very finely sharply punctulate, 5th similarly sculptured at the base only, otherwise smooth and shining. *Legs* piceo-rufescent, the tarsi testaceous, trochanters and femora densely granulose beneath ; tibiae regularly longitudinally spinulose ; tarsi very short, claws simple.

Size : 2·695–3·157 mm. long., 1·540–1·925 mm. lat.

Holotype ♂, Bolivia : Yungas Valley, 12–13.vi.1937 (*H. E. Hinton* coll.).

Paratypes : a short series, same particulars as holotype.

The form of the aedeagus (fig. 4) abruptly distinguishes this new species from all the remainder known to me.

Epimetopus hintoni sp. n.

Rufescent, head black ; convex, oval, attenuate in front, widely rounded behind ; eyes only partially divided by a canthus.

Head black ; the labrum rufescent, shining ; regularly finely granulose over frons and clypeus ; eyes about one-half divided by a canthus, this very narrow and indistinct ; maxillary palpi not elongate, 2nd and 4th segments subequal, 3rd very small, 4th segment subulate. *Antennae* rather short, 9-segmented (6+3), the scape slender, as long as the flagellum and club combined, 2nd segment globular, 3rd to 6th transverse, distal segment of the club longer than the two basal segments taken together. *Pronotum* almost as long as the greatest width, the anterior lobe strongly roundly produced, overlapping the head up to the level of the anterior margin of the eyes, extremely finely and indistinctly margined, sparingly granulose ; anterior angles very obtuse and obsolete, the sides rather angularly explanate just behind the anterior angles and in front of the middle, from the widest point to the base almost straight, attenuate, the posterior angles rather obtuse, a little more than a right angle ; the disc anteriorly with a shallow longitudinal sulcus bounded on each side by a low rounded costa, more distinct in front where they are finely canaliculate, the costae sinuous, from in front towards the base at first weakly divergent, then abruptly convergent and contiguous, then almost at the base strongly divergent, but here indistinct and very little elevated ; the general surface regularly finely granulate. *Scutellum* very small. *Elytra* convex, widely rounded behind, the margins moderately explanate ; with ten longitudinal series of obsolete small punctures, each separated from the next by a space almost twice their diameter which is raised as an elongate granulosity

even at the extreme apex ; the 1st, 3rd, 5th and 7th interseries not at all granulate otherwise than very close to the base, minutely alutaceous, dull ; the sutural, 2nd, 4th and 6th interseries raised as a low shining, obsoletely granulate costa, the 4th widely interrupted at one-quarter of the length from the base, the 8th with a short coarsely granulose tubercle at one-third of the length from the base ; humeri prominent, coarsely granulate ; epipleurs wide up to the apex, the margins granulose. *Venter* fusco-rufous ; mentum finely microscopically reticulate, sub-nitid ; anterior coxae contiguous ; mesosternum finely transversely carinate in front of the intercoxal process ; metasternum microscopically granulose ; 1st to 4th ventrites very finely, sharply and very densely punctulate, the 5th ventrite with only a narrow basal band of punctures, otherwise smooth and shining. *Legs* rufous ; trochanters and femora very coarsely granulose beneath ; tibiae finely longitudinally spinulose ; tarsi very short, claws simple.

Size : 1·805–1·919 mm. long., 0·536–0·950 mm. lat.

Holotype ♂, Bolivia : Yungas Valley, 12–13.vi.1937 (*H. E. Hinton* coll.).

Paratypes : a short series, same particulars as holotype.

This little species is superficially very similar indeed to *costatus* (LeConte), resembling it in form and colour, but the anterior pronotal lobe is rather narrower and more sharply rounded, the inter-punctural granulosities of the elytral series are visible right to the apex, the serial punctures are very small and indistinct and the median lobe of the aedeagus (fig. 5) is perfectly distinct from that of *costatus* (fig. 6).

CATALOGUE

Epimetopus Lacordaire.

Ceratoderus Mulsant, 1851, *Mem. Acad. Sci. Lyon* **1** : 1 (nec *Ceratoderus* Westwood 1841 (Paussidae)).

Epimetopus Lacordaire 1854, *Gen. Col.* **1** : 465, 467. Schwarz and Barber 1919, *Proc. ent. Soc. Wash.* **19** : 131.

Sepidulum LeConte, 1874, *Trans. Amer. ent. Soc.* **5** : 48.

Epimetopus d'Orchymont, 1933, *Bull. Ann. Soc. ent. Belg.* **73** : 287.

angulatus sp. n. . . . . Bolivia.

costatus (LeConte), 1874–6, *Trans. Amer. ent. Soc.* **5** : 48 (*Sepidulum*) . . . . . Texas, Mexico, Guatemala.

graniger (Mulsant), 1851, *loc. cit.* : 2 (*Ceratoderus*) . . . . Colombia.

hintoni sp. n. . . . . Bolivia.

lacordairei d'Orchymont, 1933, *loc. cit.* : 288 . . . . . Brazil.

thermarum Schwarz and Barber, 1919, *loc. cit.* : 130, 132, figs. 1, 2 . . . . . Arizona, Mexico.

trogoides Sharp, 1874, *Ent. mon. Mag.* **11** : 249 (*Sepidulum*) Trop. South America.

vianai sp. n. . . . . Argentina.

Eumetopus gen. n.

asperatus (Champion), 1919, *Ent. mon. Mag.* **55** : 237 (*Epimetopus*) . . . . . North India.

bullatus (Sharp), 1874, *Ent. mon. Mag.* **11** : 249 (*Sepidulum*) . . . India.

flavidulus (Sharp), 1890, *Trans. ent. Soc. Lond.* **1890** : 355 (*Epimetopus*) . . . . . Ceylon.

maindroni (Régimbart), 1903, *Ann. Soc. ent. Fr.* **72** : 338 (*Epimetopus*) . . . . . South India.

PARASITIC HYMENOPTERA FOUND IN BRITISH HOUSES, WAREHOUSES AND SHIPS. I: ICHNEUMONIDAE.

By O. W. Richards, M.A., D.Sc.

The primary aim of the present work is to record and to describe the parasitic Hymenoptera which were found associated with stored goods during the war. By an arrangement kindly made by Mr. W. McAuley Gracie, Director of Infestation Control, Ministry of Food, its Ministry's inspectors sent to me for identification all Hymenoptera which they found between December 1942, and 1946. The number of separate samples received was: 1942, 2; 1943, 34; 1944, 71; 1945, 48; 1946, 42. At the same time relevant material collected by myself and other entomologists[1] both before and during the war has been included in the study. I have also received valuable help from Mr. R. B. Benson and Mr. J. F. Perkins (British Museum (Natural History)), Mr. G. E. J. Nixon (Commonwealth Institute of Entomology) and Mr. H. St.J. K. Donisthorpe. The work was carried out under the direction of Prof. J. W. Munro in the Dept. Zoology and Applied Entomology of the Imperial College. A large number of the illustrations were prepared by my wife, Mrs. M. J. Richards.

In the drawing up of the descriptions, the following plan has been followed. The description of each species is combined with sufficient information to distinguish the *genus* from all or nearly all allied genera not found in stored products. The descriptions will not usually suffice to distinguish the *species* from all their allies in the same genus. To make them sufficient for that purpose would have entailed much revisional work and would have made the present account unduly complicated. Not all groups will be treated in the same detail. The Bethylids, which I revised in 1939, can be treated very briefly. The study of the Pteromalid Chalcidoids, on the other hand, will be offered as a contribution to the general classification of that difficult and neglected group.

Probably none of the parasites exercise sufficient control over their hosts to make them of much economic importance. In fact, the presence of parasites is often an indication of a serious and long-standing infestation by the host. On the other hand, it is only when one knows what an insect is that one can usefully say whether it is or is not important to man. It is always dangerous to pass judgment on an unidentified species.

Keys to the families of domestic Hymenoptera.

1. Species wingless or with wings very reduced. Antennae with segment 1 relatively long . . . . . 2.
   Wings fully developed . . . . . 3.
2. Abdominal petiole (between propodeum and gaster) flat, square or transverse. Antennae with a club (of three fused segments which appear one except in balsam mounts) preceded by 7 or 8 segments. Chalcidoidea (Spalangiidae).

[1] Capt. R. A. Davis, No. 1 Pest Destruction Advisory Unit, R.A.S.C., sent some useful samples from Rangoon and Singapore, which indicate the source of some of our parasites.

Abdominal petiole itself or, in some MYRMICINAE, the following segment (which in them is also petiole-like) raised into a convex dorsal scale. Antennae variable, but rarely distinctly clubbed and if so the segments not fused. . . . . Formicoidea (FORMICIDAE).

3. Abdominal petiole or the next petiole-like segment raised into a convex dorsal scale. Antennae with first segment relatively long, number of segments variable. Wing-venation relatively complete ; hind wing with no anal lobe . . . . . Formicoidea (FORMICIDAE).

Abdominal petiole not raised into a scale and following segment never petiole-like . . . . . 4.

4. Wing-venation characteristic, fore wing with no pterostigma. Abdomen laterally compressed, especially in ♀, ovipositor rather short. Antennae with 14 segments, first not long . . Cynipoidea (AYLAX).

Wing-venation very different and, unless very reduced, fore wing with a pterostigma. Abdomen not so compressed . . . . . 5.

5. The small gaster attached to the top of propodeum by a long petiole ; ovipositor short. Antennae with 13 segments, first not very long. Evanioidea (*Evania*).

Gaster longer in proportion to the petiole, which is attached to the bottom of propodeum . . . . . 6.

6. Antennae with more than 17 segments (except *Chremylus*, which has 12, and *Microbracon* ♀, which has 14), first short. Venation relatively complete. Ovipositor often long and protruding. Ichneumonoidea. 7.

Antennae with not more than 13 segments. Venation relatively to very reduced. Ovipositor usually hidden, never protruding very far . . . . . 8.

7. Intermedian cross-vein present (fig. 1) . . . . . ICHNEUMONIDAE.
Intermedian cross-vein absent . . . . . BRACONIDAE.

8. Venation characteristic, with subcostal, marginal and radial veins. Hind wing with no anal lobe. Antennae with first segment relatively long. Colour often metallic. Head (except for SPALANGIIDAE) vertical with mouth-parts directed downwards Chalcidoidea. 9.

Venation usually more complete. Hind wing with an anal lobe, sometimes small. Antennae with first segment short. Colour black. Head horizontal with mouth-parts directed forwards Bethyloidea (BETHYLIDAE).

9. Hind femur much thickened, only 2–3 times as long as thick, with ventral teeth or serrations. [Stigmal vein almost absent, less than twice as long as broad. Head and thorax black with numerous large punctures.] . . . . . CHALCIDIDAE.

Hind femur 5–6 times as long as broad, without teeth or serrations beneath (one or two teeth in some non-domestic genera). . . . 10.

10. Terminal spur of mid-tibia conspicuous, about as long as segment 1 of mid tarsi. [Bronzy-black species, four front legs partly pale ; eyes pubescent ; head with sharp margin just behind eyes and ocelli ; mesonotum with cross-striation and scattered large punctures, scutellum smooth and shining, as long as mesonotum.] ENCYRTIDAE.

Terminal spur of mid tibiae thin, inconspicuous, about half as long as segment 1 of mid tarsi . . . . . 11.

11. Pronotum approximately transversely rectangular and, omitting anterior neck-like part, of about same length in centre (where more than twice as long as pedicel) as at sides. Most of surface of propodeum forming a right-angle or nearly with surface of scutellum. [Colour black or testaceous, not metallic. Surface of thorax usually with very close umbilicate punctures, but in *Systole* shagreened. Notaulices deep and complete. Abdomen with a distinct petiole.] EURYTOMIDAE.

Pronotum either elongate with the sides converging forwards or, if the anterior dorsal margin is nearly straight, then considerably longer at the sides than at the centre, where it is hardly longer than the pedicle. Surface of propodeum set at a small angle to that of the scutellum . . . . . 12.

12. Antennae arising from depressions which are separated by a distinct keel or elevation. Integument mainly non-metallic. [Head and thorax mostly smooth and shining in domestic species. Female head elongate and ovipositor distinctly protruding. Marginal vein very long.] . . . . . SPALANGIIDAE.

Antennae arising from a slight undivided depression. Head and thorax and most of abdomen metallic. [Head and thorax with close reticulate sculpture. Female head short, oval or subcircular, ovipositor not protruding. Marginal not longer than submarginal vein.] . . . . . PTEROMALIDAE.

1. ICHNEUMONIDAE.

Only six species of this very large family have any claim to be considered regular domestic species in this country and they can easily be separated by the following artificial key. The two species of *Stilpnus*, dipterous parasites, have each occurred once ; the genus has been included in the key as the species may be found to be associated with one of the domestic Diptera. Finally, there is one record of *Phaeogenes* sp. (Manchester, warehouse, ix.1933, 1 ♀ (*A. B. P. Page*) ; this is probably a stray.

Key to the genera and species.

1. Fore wing (fig. 6) with no trace of areolet. Face and antennal sockets projecting in front of eyes in profile, face all in one plane. Abdomen black, shining, first segment relatively short and broad, ♀ ovipositor not prominent, ♂ unknown . . *Metacoelus mansuetor* (Grav.) p. 32.

Fore wing with an areolet, of which the outer vein may be weak or (*Hemiteles*, which has dark-banded wings) absent. Face in profile less prominent, not all in one plane. Abdomen often partly red, first segment forming a long petiole . . . . . 2.

2. Fore wing with the areolet (counting the outer vein, which may be weak or absent) pentagonal, bounded anteriorly by Rs. Abdomen shining . . . . . 3.

Fore wing with the areolet four-sided, inner and outer veins meeting on Rs or joined to it by a short stalk. Abdomen pubescent, rather dull ; ovipositor long . . . . . 6.

2. Propodeum with the areolar area not closed below. Sternaulus complete, mesopleuron above it smooth and shining. Outer vein of areolet weak but traceable. Malar space crossed by a band of alutaceous sculpture, but with no furrow. Antennae with 17

segments. Abdominal periole narrow, almost parallel-sided, gaster broad, shining, bare; ovipositor shorter than hind basitarsus
Stilpnus Grav. 3.

Propodeum with the areolar area closed below. Sternaulus incomplete or the mesopleuron largely alutaceous. Abdominal petiole considerably more expanded distally . . . . . 4.

3. Abdomen black. Face beneath antennae dull, densely punctured
S. gagates Grav. p. 24.

Abdomen with central segments reddish-tinged. Face beneath antennae shining, sparsely punctured . . . *S. blandus* Grav. p. 24.

4. Sternaulus almost complete, most of head and thorax alutaceous. Antennae with segments 3–5 at least four times as long as broad, with 24–27 segments. Abdomen shining, distinctly pubescent, ovipositior as long as first three segments of hind tarsi
Hemiteles cinctus (L.) p. 28.

Sternaulus widely incomplete behind, head and thorax punctured, not alutaceous. Antennae with segments 4–5 less than three times as long as broad. Malar space with no alutaceous patch, but crossed by a furrow . . . . . 5.

5. Outer vein of areolet in fore wing weak, almost parallel to the inner one. Hind femur 5–6 times as long as greatest width. Antennae with 30–33 segments (♀), 31–7 (♂). Abdomen very shining, unpunctured, ovipositor about as long as hind tarsi
Phygadeuon bitinctus (Gmel.) p. 25.

Outer vein of areolet in fore wing strong, strongly converging with the inner one. Hind femur 3 times as long as its greatest width. Antennae with 25–26 segments. Abdomen finely punctured, pubescent, ovipositor only just protruded *Barichneumon anator* (Fab.) p. 23.

6. Areolet sessile on Rs (or very nearly so). Abdominal petiole at least half as wide as postpetiole. Propodeum somewhat produced at the orifice so as to overhang the hind coxae. Hind tibia reddish to dark brown. ♂ does not occur in Britain
Nemeritis canescens (Grav.) p. 30.

Areolet joined to Rs by a stalk. Abdominal petiole less than half as wide as postpetiole. Propodeum not produced at the orifice. Hind tibia black at each end, but whitish-marked centrally. ♂ common.
Angitia chrysostictos (Gmel.) p. 31.

Barichneumon Thomson, 1893.

Head shining with numerous fine punctures, which only become really dense on the facial prominence beneath the antennae; mandibles ending in two small teeth; malar space short, as long as antennal segment 4, not alutaceous, crossed by a feeble furrow; clypeus rather well-defined, very transverse, tentorial pits deep, ventral margin straight; antennae with 25–6 segments, hardly long enough to reach back beyond the propodeum, somewhat thicker in the centre and then becoming thinner again; sides of head behind the eyes not much convergent, head, in dorsal view, considerably broader than long. Thorax shining, with numerous fine punctures, which become dense on the pronotum and front half of the mesonotum, and sparse on the mesopleuron; sternaulus short, widely interrupted behind; scutellum flat; propodeum separated from the postscutellum by a moderate furrow, spiracles elongate oval, angles not produced into teeth on tubercles, areolar area transverse, with a rounded margin above and a straight one below, costala received behind the middle of its sides. Metapleuron separated from the metasternum by a distinct raised heel. Legs stout, especially the hind ones, hind femur only three times

as long as its greatest width, claws without a tooth or comb-like bristles. Fore wing (fig. 1) with a pentagonal areolet of which the sides converge strongly forwards. Gaster joined to propodeum by a well-marked petiole, which is somewhat deflexed posteriorly, petiolar spiracles far behind its centre, further from one another than they are from the hind-margin of the petiole, narrow anterior part hardly broader than high, postpetiole (broader posterior part) distinctly punctured, its central portion a little raised and about twice as wide as the portion on each side ; abdominal tergites 2–3 with distinct but fine and numerous punctures, which become more or less obsolete on 4–7 ; tergite 2 about as long as broad, on each side of base with clearly defined, transversely oval, punctured depressions, separated by about twice their width ; ovipositor slightly protruding beyond tergite 7, in ventral view it and the associated parts not hidden by a projecting unmodified sternite. Parasites of caterpillars.

Barichneumon anator (Fabricius).

Ichneumon anator Fabricius, 1793 : 169.
I. (*Barichneumon*) *anator* Thomson, 1893 : 1960.
Barichneumon anator Morley, 1903 : 86.

Black ; mandibles reddish ; antennae with segments 3–9 reddish, 10–12 whitish, the remainder nearly black ; a small dot or streak at top of inner margin of eyes, a streak on each side of hind margins of pronotum, streak at top of mesopleuron, two confluent spots at tip of scutellum, a very small spot at margin of abdominal tergite 5, whole of 6–7, *white* ; narrow posterior margins of tergites 1–4 reddish-tinged. Legs red, coxae and trochanters, mark at tip of hind femur, tip of hind tibia and whole of hind tarsus, black. Tegulae brown, basicostal sclerite whitish brown, pterostigma black, wings hyaline. L. 7·0–10·0 mm.

Specimens examined.—CAMBRIDGE, Linton, bred in jar containing almost nothing but larvae of *Pyralis farinalis* (L.) from horse food in barn, summer, 1944, 2 ♀ (*H. E. Hinton*).

This species is often found out of doors on Umbellifers and may have other hosts. Morley (1903 : 86) notes, however, that it has several times been found on windows. It does not appear to have been bred previously.

Stilpnus Gravenhorst, 1829.

Head smooth and shining, with only the part below the antennae more or less punctured ; malar space nearly as long as antennal segment 3, crossed by a patch of alutaceous sculpture, but with no furrow ; clypeus quite well defined, tentorial pits large and deep, ventral margin produced into a slight lobe ; antennae with 16–17 segments, hollow to receive segment 2 at end of 1 almost circular, 3 elongate, at least four times as long as broad, 4 hardly longer than 5, about twice as long as broad, antennae filiform, capable of extending back to about tip of scutellum. Thorax smooth and shining, notaulices well-developed, pronotum more or less striate, sternaulus strong and deep, somewhat sculptured, extending back to mesopleural suture ; scutellum a little convex, separated from a mesonotum by a deep but not sharply defined, smooth furrow ; propodeum with spiracles very small and circular, keels defining areas strong, except the posterior margin of the areolar area, which is absent, so that that area is confluent with the petiolar area with which it forms one shallowly excavated plane, posterior margin of dentiparal area sufficiently raised to form a slight tubercle in profile. Legs not stout, hind tibia with its inner distal margin with a dense row of long, fine white setae. Fore wing with a pentagonal areolet, of which the outer vein is hyaline, pterostigma very broadly triangular. Gaster joined to the propodeum by a well-marked petiole, which is somewhat deflexed posteriorly, petiolar spiracles far behind its centre and nearer to one another than they are to the hind margin of the petiole, postpetiole (the broader posterior part of the petiole) somewhat raised and more or less alutaceous in centre, longitudinally striate at sides, abdominal

tergite 2 without depressions on each side of anterior margin, gaster rather broad oval, depressed, segmentation distinct, ovipositor very short, not as long as hind basitarsus. Parasites of Diptera.

Stilpnus gagates (Grav.).

Ichneumon gagates Gravenhorst, 1807 : 263.
I. (*Stilpnus*) *gagates* Gravenhorst, 1829 : 667.

Black, almost entirely smooth and shining except : face below antennae, which is closely punctured and rather dull (clypeus shining and sparsely punctured), pronotum, which is somewhat striate, sternaulus, which is rugose-crenulate, propodeum, which is somewhat rugose between strongly raised keels defining the areas, and postpetiole, of which central area is weakly alutaceous and lateral areas, which are striate. Antennal segments 1–3 somewhat brownish beneath. Legs, except hind coxae, testaceous. Wings hyaline, tegulae and basicostal sclerite pale testaceous, pterostigma dark brown. L. about 3·0 mm.

Lancs S., Liverpool, in mill near security wheat, 30.viii.43, 1 ♀ (*P. M. Butler*) (det. J. F. Perkins).

This species has been bred from Muscids, e.g. *Paregle radicum* (L.) in Prussia (Morley, 1907 : 242) ; from *Eroischia* (= *Phorbia*) *floralis* (Fall.) near Leningrad (Vodinskaya, 1929) ; and from *Pegomyia hyoscyami* var. *betae* (Curt.) in Belgium (Decoux and Roland, 1934). It may, perhaps, also attack flies breeding in refuse indoors.

Stilpus blandus Grav.

Ichneumon (*Stilpnus*) *blandus* Gravenhorst, 1829 : 672.

Black, almost entirely smooth and shining except : face below antennae, which is shining but sparsely punctured, pronotum, which has a few irregular rugosities, sternaulus, which has a few shallow punctures, propodeum, which is feebly rugose between the strongly raised keels defining the areas, and postpetiole, which has traces of alutaceous and striate sculpture. Antennal segments 1–2 brownish, especially beneath. Legs, except most of hind coxa, testaceous. Abdominal tergites 2–3 mostly reddish brown. Wings hyaline, tegulae testaceous, basicostal sclerite whitish, pterostigma dark brown. L. about 2·5 mm.

Differs from *S. gagates*, in colour and sculpture of face and sternaulus, and in the shape of clypeus, which is somewhat less transverse, with central half produced into a small lobe (instead of central two-thirds forming a less pronnounced lobe.)

Ireland, Co. Down, Newtonards, oat-mill, said to be very frequent in skirtings and on windows, 17.x.45, 1 ♀ (*P. M. Butler*) (det. J. F. Perkins).

This species has been bred from *Muscina pabulorum* (Fall.) in Poland (Sitowski, 1928) and it may well attack Diptera breeding in refuse indoors.

Phygadeuon Gravenhorst, 1829.

Head with eyes somewhat small, face protruding considerably in front of them and tempora broad ; malar space relatively long, usually crossed by a band of alutaceous sculpture, sometimes by a furrow ; antennae stout, 18–26 segments ; face of male not white-marked. Thorax punctured, striate or alutaceous on various areas, but usually considerably shining, sternaulus complete or more or less widely interrupted ; scutellum nearly flat, furrow between it and mesonotum not sharply defined in front and not strongly crenulate ; propodeum with spiracles small and circular, keels defining the areas moderately strong, lower margin of dentiparal area often produced into a tubercle, areolar area closed

below. Legs stout, tibiae without spines, spurs of hind tibia inserted at its distal end, which on the inner side has a relatively short pubescent fringe. Wings (fig. 2) usually fully developed, areolet pentagonal, outer vein sometimes weak, pterostigma only moderately broad ; vein *im* forming an acute angle with M3+4 and exhibiting two small hyaline spots (fenestrae). Gaster joined to the propodeum by a well-marked petiole, which is somewhat deflexed posteriorly, petiolar spiracles well behind the middle, nearer to one another than to hind margin of petiole, abdominal tergite 2 without anterior impressions on each side, abdomen elongate-fusiform, usually smooth and shining, sometimes striate, rarely at all alutaceous, ovipositor more or less elongate. Parasites of Diptera and Lepidoptera.

Phygadeuon bitinctus (Gmel.).

Ichneumon bitinctus Gmelin, 1790 : 2719.
Phygadeuon bitinctus Morley, 1907 : 74.
Sternocryptus bitinctus Roman, 1925 : 12.

Female.—Black ; proximal half of antennae more or less testaceous, especially beneath mandibles (except the teeth), mouth-parts, tegula, legs (except proximal part of hind coxa and dorsal shade on hind femur) testaceous ; abdomen, except petiole (of which a posterior spot is rarely red), reddish ; wings hyaline, basicostal sclerite whitish, venation, except close to tegula, dark brown, pterostigma with a very small pale proximal spot. L. 3·5–7·0 mm.

Mandibles shining, unpunctured, with two subequal distal teeth, proximally rather abruptly convex ; head in profile not so protuberant as in many species of the genus, tempora ventrally one and a quarter times as broad as median width of eye, which is bare ; malar space about as long as antennal scape (measured on inner side), crossed by a furrow and without an alutaceous band ; clypeus well-defined, tentorial pits large and deep, surface smooth and shining, with 2 or 3 scattered punctures, slightly transversely convex, ventral margin straight, untoothed, narrowly marked off by a feeble furrow ; face between clypeus and antennal sockets strongly centrally convex, closely and finely punctured, dull, orbits nowhere alutaceous, vertex finely and rather closely punctured, widely depressed to receive the antennal scapes, depressions shining and transversely striate, POL . OOL = as 2 : 3 ; antennae rather thin for this genus, filiform, capable of extending back to brow of propodeum, with 19 segments (19 specimens counted), scape subcylindrical, externally a little excised, segment 3 three and a half, 9 one and a half times as long as broad, 4 three-quarters as long as 3, remainder to 7 progressively a little shorter ; keel defining cavity for reception of mouth-parts rather strongly raised, receiving occipital keel at some distance from mandibles.

Thorax with mesonotum finely punctured and pubescent, moderately shining, notaulices of moderate length, depression in front of scutellum smooth, pronotum in side view with some irregular striae, sternaulus short and shallow, mesopleuron shining, punctured and finely striate, dorsal posterior corner smooth ; propodeum with the areas defined by strongly raised keels, surface shining, very finely rugose, areolar area hexagonal, as broad as high, its posterior corners raised into distinct tubercles, lower edge of dentiparal area also tuberculate. Abdominal petiole broadening considerably posteriorly, posterior two and a half times as wide as anterior margin, spiracles a little projecting, dorsal keels almost coincident with lateral margins, surface very feebly striate, tergites 2–7 smooth and shining, unsculptured, a little short pubescence on the sides of 2–3, and on whole of 4–7 ; ovipositor a little longer than the hind tarsus.

Male.—Resembles female except : last 3–4 abdominal tergites more or less black. L. 2·0–6·0 mm.

Dorsal part of clypeus finely punctured ; antennae much longer, extending back to end of abdominal petiole, setaceous with short outstanding pubescence, of 19–24 segments (of those counted 1 had 19, 1 had 20, 14 had 21, 9 had 22, 1 had 23 and 1 had 24), segment

3 six, segment 9 three times as long as broad, some of segments 9–14 (usually each of 10–13) with a sharp lateral keel. Propodeum with tubercles stronger, areolar area usually broader. Abdominal periole narrower, posterior only twice as broad as anterior margin ; proximal half of tergite 2 often a little striate.

Specimens examined.—Scilly Is., Castle Bryher, 20.vii.27, 1 ♀ (*Tinaea pallescentella* occurred on this island). Belfast, dock warehouse, with *T. pallescentella* Stt., 11.ix.45, ♂ ♀ (*J. E. Cranham*) ; warehouse, with *Endrosis sarcitrella* (L.) and *T. pallescentella*, 18.xi.42, ♂ ♀ (*A. O'Farrell*) ; granary, with *T. pallescentella*, 2.xi.43, ♂ ♀ (*A. O'Farrell*) ; warehouse, with *Hofmannophila pseudospretella* (Stt.), 17.xi.44, 1 ♀ (*A. O'Farrell*) ; warehouse, with *T. pallescentella*, 11.ix.45, 5 ♂, 4 ♀ (*J. E. Cranham*). Glamorgan, Swansea, on bulk wheat, 16.vi.43, 1 ♂ (*P. M. Butler*). South Devon, Teignmouth, in store, 1.x.46, ♂ (*E. W. Powell*) ; Exeter, flour mill, 17.iv.46, ♂ (*E. W. Powell*). Gloster, West, Sharpness, granary with *T. granella* (L.), 24.viii.42 (*R. Howe*). London, Chelsea, in food store, 20.iii.43, ♀, 2 ♂ (*H. E. Hinton* and *R. F. Ewer*). Cambridge, Linton, material in jar from which emerged *T. semifulvella* Haw. and *Monopis ferruginella* (Hb.), ♂ ♀ (*H. E. Hinton*). Lancs, South, Blackburn, in flour mill with *Tinaea*, 2.xii.46, ♂ (*J. D. Norris*) ; Liverpool, warehouse with *T. pallescentella*, *Hofmannophila* and *Endrosis*, i.44, 1 ♀ (*P. M. Butler*) ; warehouse, 27.ix.43, ♂ ♀ (*P. M. Butler*) ; in warehouse with wheat, 23.xi.43, 2 ♂, 1 ♀ (*P. M. Butler*) ; warehouse with wheat, 30.viii.43, ♂ ♀ (*P. M. Butler*) ; in warehouse sweepings, with *Ephestia* and *Plodia*, 11.xii.43, 2 ♂, 1 ♀ (*P. M. Butler*) ; Salford, timber sheds with *T. pallescentella*, 31.x.45, 1 ♀ (*G. Swaine*). Ayrshire, Girvan, animal feed store, with *T. pallescentella*, viii.44, 3 ♀ (*J. A. Downes*). Edinburgh, with *Tinaea*, 11.iii.46 (*G. T. Jefferson*). Glasgow, wheat with *T. pallescentella*, 25.x.44, 1 ♀ (*M. M. Wills*) ; flour mill, with *T. pallescentella*, v.45, 2 ♂, 1 ♀ (*M. M. Wills*) ; flour mill with *Tinaea*, etc., 24.iv.46, 2 ♂, 2 ♀ (*M. M. Wills*). Berks, Medmenham, reared from nest of (?) greenfinch, emerging 1934, ♀, 1 4.v, 2 5.v., ♂ 1 28.iv, 1 16.vi, 1 18.vi, 3 19.vi, 3 20.vi, 3 22.vi, 1 23.vi, 1 26.vi, 1 28.vi, 1 24.vii (*E. B. Basden*).

This species is evidently a parasite of *Tinaea*, especially *T. pallescentella* Stt., but it is not impossible that it also attacks *Endrosis* or *Hofmannophila*. From the nature of its hosts, it is likely to be found in birds' nests as well as warehouses ; the Scilly Is. specimen was probably associated with the nests of seabirds. The specimens from Medmenham have the mesopleuron rather more strongly striate, the antennae of paler colour, the hind coxae entirely pale, and sometimes a pale spot at the end of the abdominal petiole. Schmie-

---

EXPLANATION OF FIGURES.

Fig. 1.—*Barichneumon anator* (Fab.). Wings, bristles omitted. *a*, areolet ; *b*, intermedian cross-vein.

Fig. 2.—*Phygadeuon bitinctus* (Gmel.). Wings. *a*, areolet enlarged.

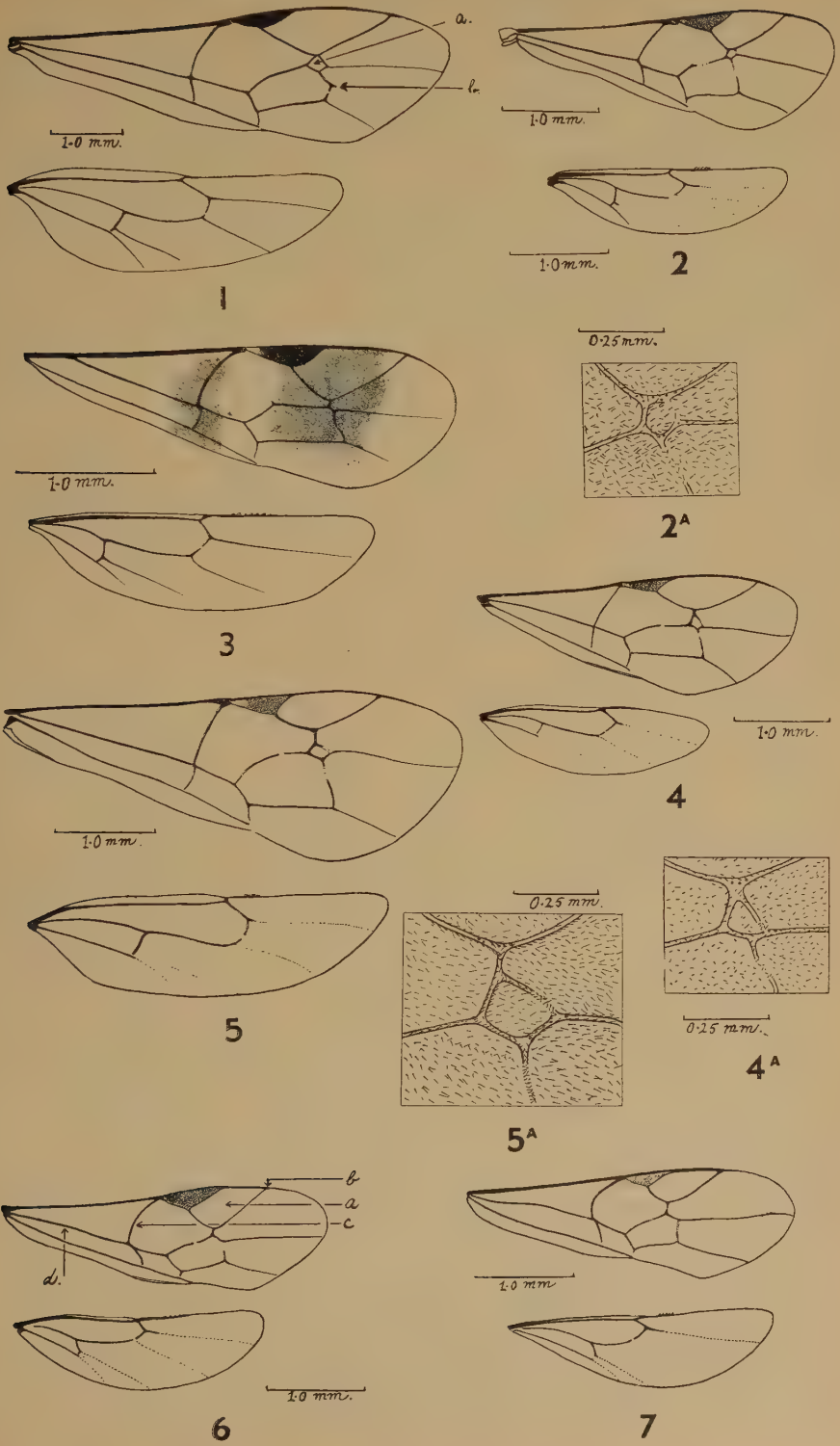
Fig. 3.—*Hemiteles cinctus* (L.). Wings.

Fig. 4.—*Nemeritis canescens* (Grav.). Wings. *a*, areolet enlarged.

Fig. 5.—*Angitia chrysostictos* (Gmel.). Wings. *a*, areolet enlarged.

Fig. 6.—*Metacoelus mansuetor* (Grav.). Wings. *a*, radial cell ; *b*, metacarp ; *c*, M + mcu ; *d*, Cu.

Fig. 7.—*M. flaviceps* (Ratzeb.). Wings.


a.
b.
1·0 mm.
1·0 mm.
1·0 mm.
2
1
0·25 mm.
1·0 mm.
2A
3
1·0 mm.
4
1·0 mm.
0·25 mm.
0·25 mm.
4A
5
5A
b
a
c
d.
1·0 mm.
1·0 mm
6
7

deknecht (1932 : 42) notes that it is often found on windows, while Morley (1907 : 74) and Roman (1925 : 12) note that it is found on leaves with aphid secretion.

Roman (*loc. cit*) erected a new genus, *Sternocryptus*, for this species. The principal character given is the short sternaulus. As however this character is developed to varying degrees in many other species, I do not think that it alone can be used to define a genus. I suspect, nevertheless, that in a thorough revision of *Phygadeuon*, this species and some others, which may also prove to be parasites of Lepidoptera, will be separated out.

The species *Phygadeuon rusticellae* Bridgm., which Mr. E. B. Basden has also bred in large numbers from birds' nests, is not, as its name might suggest, a parasite of Lepidoptera, but of Diptera.

Hemiteles Gravenhorst, 1829.

Differs from *Phygadeuon* as follows :

Eyes usually larger ; antennae more slender, with 17–30 segments; body often duller owing to closer and finer sculpture; legs more slender; fore wing (fig. 3) with areolet externally open or *rm*3 very weak indeed ; parasites of various insects and of spiders.

Hemiteles cinctus (L.).

Ichneumon cinctus Linnaeus, 1758 : 566.
Hemiteles cinctus Roman, 1932 : 4.
H. bicolorinus Gravenhorst, 1829 : 862.
H. bicolorinus Morley, 1907 : 130.

Female.—Blackish brown ; mandibles (except tips) and mouth-parts, yellow or (in some specimens) dark brown ; antennae, except last 8–10 segments, testaceous ; thorax becoming paler laterally and ventrally, pronotum pale reddish, pleura and propodeum black with some reddish areas to almost entirely reddish ; legs testaceous, hind tibiae sometimes darker ; wings (fig. 3) hyaline, with two brown bands, tegula testaceous, basicostal sclerite white, pterostigma brown with a small white anterior mark ; abdomen dark reddish brown to black, with some reddish marks at sides of segments. L. 2·5–4·0 mm.

Mandibles shining, unpunctured, with two subequal distal teeth, proximally rather abruptly convex ; head in profile projecting very little in front of eyes, tempora ventrally about four-fifths as wide as median width of eye which is bare ; malar space not quite as long as antennal scape measured on the inner side, crossed by a band of alutaceous sculpture, which is inconspicuous because the whole head is alutaceous ; clypeus small, ill-defined, flat, smooth and shining, tentorial pits small and almost at ventral margin, which is narrowly set off but not toothed ; face between clypeus and antennal sockets almost flat, front only feebly impressed to receive the antennal scapes, POL : OOL usually 3 : 2, but 1 : 1 in one very small specimen ; antennae filiform, of 24–27 segments (11 spec. counted), scape somewhat swollen, outer edge of cavity for the reception of segment 2 considerably excised, segment 3 about four times as long as broad, 4 a little shorter, remaining segments each progressively a little shorter, 9 about twice as long as broad ; keel defining cavity for reception of mouth-parts not strong, receiving the occipital keel a short distance from mandibles. Thorax and propodeum finely alutaceous, dorso-posterior corner of mesopleuron and more ventral parts of propodeum (especially petiolar area) often more shining ; notaulices not developed, depression in front of scutellum shallow, not crenate ; sternaulus nearly complete but shallow ; propodeum with areas, except to some extent the petiolar, rather feebly defined, lower margin of dentiparal area hardly tuberculate, areolar area hexagonal, as broad as high, closed below. Fore tibia not much thicker distally than proximally ; spurs of hind tibia shorter than in allied species. Abdominal

petiole three and a half times as broad at posterior as at anterior margin, sides regularly diverging, spiracles not projecting, dorsal keels hardly indicated, surface alutaceous; tergites 2–7 shining, only 2 with a patch of feeble alutaceous sculpture, pubescence very short and inconspicuous; ovipositor about as long as first three segments of hind tarsi.

Male.—Very similar to the female, but with longer more slender antennae with 25–6 segments.

Specimens examined.—Oxford, house window, 16.vi.26, 1 ♀; museum window, 27.iv.27, 1 ♀. Surrey, Bagshot, on pine trunk, 8.vi.34, 1 ♀. Bucks, Iver, window, 18 and 19.vi.29, 2 ♀; Slough, windows, 24.vi.29, 3.vi.32 12.ix.33, 13 and 2 on 17.v.34, 6 ♀. E. Kent, Margate, ex *Tinaea pellionella* (L.), 2 ♀ (*Mrs. E. B. Basden*); W. Kent, Goudhurst, on window, 12.viii.34, 1 ♀. E. Sussex, Eastbourne, in material infested with *Tinaea bisselliella* (Humm.), 8.viii.13, ♂ ♀ (C. W. Colthrup, B.M.).

I have also seen one male of this or an allied species found in culture-jar of *T. pellionella* by Dr. M. J. D. White. According to Schmiedeknecht (1904–06 : 814; 1932 : 814) it is commonly found on windows, but in the earlier references he states that it is a parasite of *Anobium* as well as of several moths breeding out of doors. Morley (1907 : 130) records a number of hosts, and besides its occurrence out of doors, notes that it is often found on windows. He gives a definite record from *Endrosis sarcitrella* (L.) [*fenestrella*]. Other records in the literature are: From the Muscid, *Limnophora* (= *Melanochelia*) *riparia* (Fall.), Keilin (1917); from *Lyonetia clerckella* (L.), Kemner (1926); from *Cydia molesta* Busck and *Kakivoria flavofasciata* Nagana, Uchida (1933); from *Tineola bisselliella* (Humm.), Notini (1939). All these hosts, except *Limnophora* (which I must regard as doubtful), are Lepidoptera; *Hemiteles* is a very difficult genus, much in need of revision, and certainly in the past many parasites have been wrongly identified.

Notini (1939) also bred the allied species, *Hemiteles bipunctator* (Thunbg.) (= *cingulator* Grav.), from *Tineola*. This species is also recorded by Morley (1907 : 134) and Schmiedeknecht (1932 : 30) as common on windows; several Lepidoptera and spiders' eggs are mentioned as hosts. My own four specimens were captured as follows: Bucks, Iver, on window, 18 and 19.vi.29, 2 ♀; Slough, on window, 26.v.31. W. Kent, Goudhurst, 26.vi.32. It is distinguished from *H. cinctus* (L.) as follows:

Larger, length 4·0–5·0 mm., head and thorax more coarsely sculptured, mandibles finely rugose, not convex proximally, clypeus less transverse, densely punctured, antennae with 26–30 segments, scape more cylindrical, outer margin of hollow for reception of segment 2 less excised, POL : OOL = 1; notaulices distinct, propodeal areas more strongly defined, tubercles more distinct, spurs of hind tibia long; abdominal petiole more dsitinctly striate, tergite 2 not alutaceous but finely punctured, with traces of striae on proximal half, distally with a reddish margin, joint between tergites 2 and 3 constricted. The male resembles the female except that the antennae are longer and thinner; one specimen (B.M.) had 29 antennal segments.

Nemeritis Holmgren, 1858.

Head, seen from above, transverse; mandibular teeth small, about equal; clypeus with ventral margin feebly curved, tentorial pits very small, face with dense silvery pubescence, eyes bare, not converging ventrally, nor emarginate, ocelli small. Thorax with notaulices hardly developed, propodeal spiracle small and circular, petiolar area not longi-

tudinally excavate, ventrally produced some distance over hind coxae, areolar area much longer than broad. Legs with two spurs at the end of mid tibia, hind tarsus not thickened, hind tarsus with segment 5 and claws small, latter without tooth or comb of bristles. Fore wing (fig. 4) with areolet four-sided, *im* received near middle of areolet, pterostigma narrow, *ir* and Rs set at an angle with one another. Hind wing with Cu1+M4 in the direction of the costa sloping proximally, position of M3+4 only indicated by a slight kink in Cu1+M4. Abdomen with petiole long and narrow, not deflexed, spiracles at one-third its length from posterior margin, not lying in lateral furrows and not projecting, posterior part (postpetiole) narrowly long-oval, tergite 2 at least twice as long as broad, spiracles somewhat behind its middle, abdomen behind segment 2 elongate and compressed, ovipositor long.

Nemeritis canescens (Grav.).

Campoplex canescens Gravenhorst, 1829 (3) : 555.
Nemeritis canescens Thomson, 1887 : 1120.

Female.—Black; mandibles, except tips, mouth-parts, underside of antennal scape, four anterior coxae and trochanters, tip of hind coxa, yellow. Rest of legs reddish yellow to reddish brown, except dorsal side of hind femur, hind tibia (except narrow proximal ring) and hind tarsus, which are dark brown to black. Abdomen with segments 3–7 red with a black dorsal shade, sometimes rather large. Tegula and basicostal sclerite white, venation and pterostigma dark brown, wings hyaline. L. 5·0–7·0 mm.

Antennae longer than the head and thorax with 31–37 segments. Ovipositor about as long as the hind tarsus + half the tibia. Hind margin of tergite 7 with a small V-shaped emargination.

Specimens examined.—Belfast, warehouse of flour mill, 22–3.viii.45, 3 ♀ (*P. M. Butler*); bakery, 20.xii.46, 2 ♀ (*K. F. Salmond*). Co. Armagh, Portadown, in bakery with much *Ephestia kühniella* Zell., 19.v.44, 4 ♀ (*A. O'Farrell*). Glasgow, flour-mill, 1.vi.44, 1 ♀, flour-mill with *E. kühniella*, 23.viii.44, 1 ♀ (*J. A. Downes*). Midlothian, Leith, flour-mill with *E. kühniella*, 15.v.45, 2 ♀ (*J. H. Fraser*). Dumfries, mill with much *E. kühniella* and a few *E. elutella* (Hb.), 1.v.44, 2 ♀ (*J. A. Downes*). Durham, Newcastle, in ship on oil-cake ex R. Plate, 26.vi.45, ♀ (*M. K. Watt*). Yorks, Sheffield, flour-mill, 9.v.44, 1 ♀ (*H. P. Moon*). S. Devon, Exeter, flour-mill, 22.xii.45, 2 ♀ (*E. Powell*); Tiverton, flour-mill, 17.vi.46, ♀ (*E. W. Powell*). Monmouth, Newport, flour-mill, iv.43, 3 ♀ (*P. M. Butler*). London, Battersea, mill with *E. kühniella*, 19.vii.43, 3 ♀ (*J. E. Winterbotham*); Millwall, granary with bulk wheat, much *E. elutella* and little *E. kühniella*, 3.viii.43, 4 ♀, 31.viii. 44, 1 ♀ (*O. W. R.*). W. Kent, Sevenoaks, flour-mill, 27.xi.43, 2 ♀ (*G. A. Brett*).

This is the well-known parasite of *Ephestia*, attacking principally *E. kühniella* Zell. and less commonly other species of the genus and even more rarely other genera (*Plodia*, *Galleria*). It emerges from the full-grown larva after it has spun up. In this country, at any rate, males are only produced as a very rare abnormality. Some account of the biology will be found in papers quoted in Richards and Thomson (1932 : 224); in Ahmad (1936) and in an unpublished Ph.D. thesis of E. S. Narayanan (London, 1945).

Angitia Holmgren, 1858.

Very similar to *Nemeritis* Hlgrn., but propodeum not produced over the hind coxae, petiolar area usually not much longer than broad, sometimes open below. Wings (fig. 5); hind wing with Cu1+M4 straight, about perpendicular to costa no trace of M3+4. Abdo-

minal petiole not so long, posterior part (postpetiole) broader, tergite 2 hardly twice as long as broad, abdomen moderately compressed after segment 3, not or not extensively red-marked. According to Townes (1945 : 648) the correct name for this genus is *Horogenes* Först.

Angitia chrysostictos (Gmel.).

Ichneumon chrysostictos Gmelin, 1790 : 2721.
Angitia chrysosticta Thomson, 1887 : 1157.

Female.—Black ; mandibles (except teeth), mouth-parts, more or less distinct area beneath antennal scape and segment 2, fore trochanter and most of fore coxa, mid trochanter, distal part of hind trochanter, yellow. Legs otherwise yellowish to brownish red, except mid and hind coxa, proximal part of hind trochanter, sometimes hind femur beneath proximally and above distally, ring just beneath proximal end (beyond a whitish patch) and distal quarter of hind tibiae, and broad annulations of mid and hind tarsi, which are dark brown to black. Tegula and basicostal sclerite creamy white ; wings hyaline, venation brown, pterostigma yellowish brown, its margins darker. Sides of tergite 3 with a variable red mark, sometimes very small, rarely absent. L. 5·0–6·0 mm.

Face densely and finely punctured and alutaceous ; antennae with 28–33 segments ; malar space about as long as width of antennal segment 3 ; sides of head behind eyes rounded and convergent. Mesonotum dull, densely sculptured, punctures almost imperceptible, in side view little convex ; mesopleuron shining, only ventral half finely alutaceous and even then somewhat shining, most of surface with numerous fine punctures separated by about twice their diameter, dorsal posterior corner shining, unsculptured ; propodeum shining, feebly rugose, areas distinct, areolar pentagonal but open below, the costulae received at the corners adjacent to the anterior point of the pentagon, basal area quadrangular or triangular, in the latter case sometimes stalked. Fore wing with areolet symmetrically petiolate, *im* received at or hardly after its centre and forming an angle of about 60° with M3+4. Abdomen with petiole not very much longer than the rather widely rounded postpetiole, sides excavated in a slight groove just where it joins the postpetiole ; second tergite about one and a half times as long as posteriorly broad, with a smooth spot on each side of anterior margin though some distance behind it ; tergites 6 and 7 both distinctly angularly marginate ; tergites 1 and 2 dull and alutaceous, 2 with a narrow shining posterior margin, which on succeeding segments spreads over more and more of the abdomen, which therefore appears shining posteriorly ; ovipositor slightly curved upwards, as long as the hind tarsi.

Male.—Resembles female except : yellow on legs rather more extensive, e.g. includes the whole of the mid trochanter, mid tarsi mainly yellowish. Sides of abdomen often rather more red-marked, tergites fully twice as long as broad. Antennae with 31–37 segments.

Specimens examined.—Shropshire, Newport, warehouse with *Ephestia elutella* (Hb.) and *Hofmannophila pseudospretella* (Stt.), 20.iv.43, 3 ♂. Warwick, Whitchurch, in store, 22.v.44, 1 ♀ (*C. H. Brown*) ; Milverton, on cattle-cake with *E. elutella* and a few *Endrosis sarcitrella* (L.), 19.vi.42, ♀, 8 ♂ (*J. M. Holborn*) ; with wheat with *E. elutella*, summer, 1946, ♀, 4 ♂ (*J. A. Freeman*). Gloster, West, Bristol, on bulk wheat, 22.xii.43, 1 ♀ (*R. J. A. F. Clarke*), bred ex larva *E. elutella*, bulk wheat, 23.iii, emerged at 25° C. 28.iv.43, 1 ♂ (*N. Waloff*). Gloster, East, Gloucester, on bulk wheat with *E. elutella*, 21.x.41, ♀, 2 ♂ (*G. S. Whitfield*). South Devon, Tiverton, flour-mill, 17.vi.46, ♀ (*E. W. Powell*). Bucks, Slough, on window, 18.x.30, 1 ♀, 17.ix.41, 1 ♀, 21.i.44, 1 ♂, bred in lab. on *E. elutella*, 26.vi, emerged 16–19.vii.43, ♀, 4 ♂ (*E. B. Basden*) ; Burnham, ex larva *Hofmannophila pseudospretella*, 24.vi, 2 ♂,

2.vii.42, 1 ♀ (*E. B. Basden*). LONDON, warehouse with bulk wheat, on windows 18.v.43, 1 ♂, 26.vi.43, ♂ ♀ (*E. B. Basden*), 3.viii.43, ♂ ♀, 5.viii.43, ♂, 14.ix.44 ♂; bred refuse from window-sill, 13.v, em. 2.vii.43, 1 ♀.

The records of hosts of this species in the literature, e.g. Morley (1914 : 193), are open to doubt owing to the difficulty of correctly determining species of *Angitia*. Morley, however, gives one record of finding it abundantly on the windows of his house in Suffolk, where it may have attacked *Endrosis sarcitrella* (L.) (= *fenestrella*). According to Leclercq (1946) it is the most important parasite of *E. elutella* in Belgium. The parasitic larva emerges from the fully fed resting caterpillar.

Metacoelus Förster, 1868.

(= *Polyclistus* Förster, 1868).

Face, up to and including the antennal sockets, strongly protuberant in profile, all in one plane. Head vertically declivous immediately behind the ocelli and a very short distance behind the eyes. Notaulices in the form of small circular pits at the front margin of mesonotum. Fore wing (fig. 6) with no trace of areolet. Dorsal surface of propodeum divided into a number of areas by distinct raised keels. Hind femora much thickened. First abdominal segment not narrowed anteriorly into a petiole, bearing two dorsal keels, which do not extend on to second segment, abdomen otherwise shining, very finely punctured. Female ovipositor normally hidden and (when ♂ is present) sexes difficult to separate externally on abdominal structure. According to Townes (1945 : 581) the correct name for this genus is *Hypsicera* Latr.

Metacoelus mansuetor (Grav.).

Ichneumon mansuetor Gravenhorst, 1807 : 254.
Polyclistus mansuetor Morley, 1911 : 25.
Metacoelus mansuetor Schmiedeknecht, 1925 : 3163.

Female.—Shining black; top of face immediately below antennae, proximal half of antennae, legs except sometimes proximal part of fore and hind coxae, reddish brown. Wings hyaline, venation, except the pale articulations, blackish brown, tegulae pale brown. Antennae with 24–28 segments. L. 3·0–4·5 mm. ♂ unknown.

Specimens examined.—CARDIGAN, Llandre, window, 1.ix.43. N. DEVON, Northam, viii.15 (Meade-Waldo, B.M.). WEST GLOSTER, Rodborough, window, 12.viii.38 (*T. B. Fletcher*). WILTS, Salisbury, Pitton, bred *Tinaea pellionella* (L.), 2 ♀ (*H. E. Hinton*). SOUTH HANTS, New Forest, on flower *Angelica*, 24.viii.12 (G. T. Lyle, B.M.). NOTTS, Lastingham (T. A. Marshall, B.M.). NORTHANTS, Bugbrooke, ♂ ♀ (T. A. Marshall, Fitch coll. B.M.). OXON, Oxford, at light, 7.viii.26. CAMBS, Linton, bred *T. pellionella* (L.) in bird's nest in eaves of house, vii.43, 11 ♀ (*H. E. Hinton*); bred *T. pellionella* (L.) in barn, viii–ix.43, 2 ♀ (*H. E. Hinton*). HERTS, St. Albans (T. A. Marshall, B.M.). LONDON, 6 ♀ (T. A. Marshall, B.M.); Ealing, window of house, 25.vii.46; window of granary, 3.viii.43; in cultures of *T. pellionella* (L.) at Ministry of Food, Infestation branch, 14.ii.44 (*M. J. D. White*); in grounds of British Museum, 25.viii.17, 3 ♀ (R. E. Turner, B.M.). BUCKS, Farnham Royal, i.45, late pupa extracted from pupa of *T. pellionella* (L.) (*Mrs. E. B. Basden*); Slough, on window, 1.vii.46, 16.vii.44, 11.ix.42; Iver, on window, 27.vii.30, 2 ♀. SURREY, Maldon, 17.viii.183 (Fitch coll., B.M.). WEST KENT, Goudhurst, window, 12.viii.34, 17.ix.33, floating on water-butt,

8.vii.37 ; Darenth (T. A. Marshall, B.M.), British, 7 ♀ (Stephens col., B.M.), 4 ♀ no data, 1 ♀ " willow *Tortrix* 30.vii.83," 1 ♀ "? *Tortrix* pupa on sallow, vii.82" (Fitch coll., B.M.). FRANCE, Nantes, 6 ♀ (T. A. Marshall, B.M.). GERMANY, 7 ♀ (Ruthe coll., B.M.), 1 ♀ (det. Gravenhorst, B.M.). EUROPE, 4 ♀ (B.M.). MADEIRA, 7 ♀ (Wollaston coll., B.M.). U.S.A., Colorado, Boulder, vii (T. D. A. Cockerell, B.M.).

The antennal segment number of the undamaged specimens was as follows :

Number of segments	24	25	26	27	28
Number of specimens	6	22	32	8	3

A previous breeding record is that of Morley (1930), who reared it from *T. pellionella* (L.) in Suffolk. Schmiedeknecht (1925 : 3164) notes that it is common on windows and mentions *Pyralis farinalis* (L.), *Hyponomeuta padella* (L.) and *Tortrix* sp. (Fitch record above) as hosts. In this country the species is rarely taken out of doors and it may not always have been distinguished from *M. flaviceps* (Ratz.). Another species, *M. flaviceps* (Ratzeb.), may sometimes be confused with *M. mansuetor* and is occasionally found on the windows of houses. It differs as follows :

Female.—Face below the antennae much more closely punctured ; third antennal segment longer, antennae longer and thinner, but with about same number of segments (25, 26, 26, 26, 27). Fore wing (fig. 7) with radial cell more acutely pointed externally, the pointed part being distinctly longer than the quadrate proximal part (in *mansuetor* these parts are of equal length), metacarp a little longer, vein M+mcu a little more strongly bent, proximal part of Cu more sinuate and often with a slight projection. Propodeum inside view more flattened, in dorsal view less excavated posteriorly, central area long, parallel-sided, without an anterior transverse keel (nearly always present in *mansuetor*) cutting off a narrow basal area, sides of central area not angularly dilated posteriorly (in *mansuetor*, with the cutting off of the basal area and the dilation of the sides, the central area is a little longer than, not twice as long as, broad). First abdominal segment markedly longer than broad (in *mansuetor* about as long as broad). L. 3·0–4·0 mm.

Male.—Face, anterior margin of mesopleuron, often pronotum laterally, yellow. Antennae pale beneath, legs yellower. Antennae much longer and thinner, proximal segments about two and a half times as long as broad, 25, 26, 27, 28, 28, 29 segments. Fore wing with veins M+mcu and proximal part of Cu more as in *M. mansuetor*. L. 3·0–5·0 mm.

Specimens examined.—HEREFORD, Fownhope, Pagets Wood, 1.vi.36, ♂ (E. B. Britton and J. F. Perkins, B.M.). DORSET, Hengistbury Head, 3.vi.38, ♀ (*P. Freeman*). BUCKS, Brickhill, 21.vi.38, ♀ (R. B. Benson, B.M.) ; Slough, on bamboo, 19.viii.33, ♂, on *Acer negundo*, 22.viii.33, ♀, on window, 19.vi.41, ♀ ; Iver, 11.vi.29, ♀, on window, 19.vi.29, ♀ ; Penn, 17.vi.34, ♂ (J. F. Perkins, B.M.). NORTH ESSEX, Colchester, 1914, ♂ (Harwood, B.M.). WEST KENT, Goudhurst, 13.viii.35 (O. W. R., B.M.). SWEDEN, ♂ compared with specimens in C. G. Thomson's collection (J. F. Perkins, B.M.).

It will be seen that eight of the eleven specimens were caught in June, which is earlier than any of the *M. mansuetor* and that only two of them were obtained on windows. Morley's description of *M. flaviceps* (1911 : 27) agrees well with the above species, especially in the structure of the antennae and pro-

podeum. He records it from Surrey (Capron) and East Suffolk (Foxhall, bred from Tortricid pupae, and Monks Soham).

There is a third British species, *M. femoralis* (Geoffr. *in* Fourcr.). It is larger, length about 6·0 mm., and has about 35 antennal segments, of which the third is considerably longer than broad. The radial cell has a very long pointed portion. The male is probably unknown and the species is found out of doors.

References.

Ahmad, T., 1936, The influence of ecological factors on the Mediterranean flour-moth, *Ephestia kühniella* and its parasite, *Nemeritis canescens*. *J. anim. Ecol.* **5** : 67–93, 4 figs.

Decoux, L., and Roland, G., 1934, Étude de la pégomye de la betterave en Belgique en 1933. *Publ. Inst. amél. Better. Tirlemont* **2** (5) : 139–165, 5 figs.

Fabricius, J. C. F., 1793, *Entomologia systematica*, etc. **2**. Hafniae.

Förster, A., 1868, Synopsis der Familien und Gattungen der Ichneumonen. *Verh. Naturh. Ver. preuss. Rheinl.* **25** : 135–221.

Gmelin, J. E., 1790, *Linné's Systema naturae*, Ed. 13. I. Lipsiae.

Gravenhorst, J. L. C., 1807, *Vergleichende Übersicht des Linneischen und einiger neueren zoolgischen Systema*, etc. Goettingen.

—— 1829, *Ichneumonologia Europaea*. 3 vols. Vratislaviae.

Holmgren, A. E., 1858, Conspectus generum Ophionidum sueciae. *Öfvers. Svensk. Vet. Akad. Förh.* **15** : 321–330.

Keilin, D., 1917, Recherches sur les Anthomyides à larves carnivores. *Parasitology* **9** : 325–450, 11 pl., 41 figs.

Kemner, N. A., 1926, Clerck's mineramal (*Lyonetia clerckella* L.) dess biologie och metodarna för dess bekämpande. *Medd. Centralanst. forsöks. Jordbruks.* **301**, 57 pp., 14 figs. (1926, *Rev. appl. Ent.* (A) **14** : 612.)

Leclercq, J., 1946, Insects brought with hay from the meadows into the hayloft. *Ent. mon. Mag.* **92** : 138.

Linnaeus, C., 1758, *Systema naturae*, Ed. 10. Holmiae.

Morley, C., 1903–1914, *Ichneumonologica Britannica*. Plymouth. **1**, 1903 ; **2**, 1907 ; **4**, 1911 ; **5**, 1914.

—— 1930, Clothes moths' parasite. *Trans. Suffolk Nat. Soc.* **1** : 101.

Narayanan, E. S., 1945, Factors affecting the rate of reproduction in *Nemeritis canescens* (Grav.) (Hymenoptera ; Ichneumonidae). London University, Ph.D. Thesis.

Notini, G., 1939, Klädesmalen. Medd. St. Växtskyddsanst. **28**, 32 pp., 17 figs. (1940, *Rev. appl. Ent.* (A) **28** : 7.)

Richards, O. W., and Thomson, W. S., 1932, A contribution to the study of the genera *Ephestia*, Gn. (including *Strymax*, Dyar) and *Plodia*, Gn. (Lepidoptera, Phycitidae), with notes on the parasites of the larvae. *Trans. ent. Soc. Lond.* **80** : 169–250, 8 pl.

Roman, A., 1925, Schwedische Schlupfwespen, alte und neue. *Ark. Zool.* (A) (4) **17** : 1–34.

—— 1932, The Linnean types of *Ichneumon* flies. *Ent. Tidskr.* **53** : 1–16.

SCHMIEDEKNECHT, O., 1904–06, *Opuscula ichneumonologica*, Bd. **2**, fasc. **6–13**. Blankenburg.

—— 1925, The same, Bd. 5, fasc. **40**. Blankenburg.

—— 1932, *Opuscula ichneumonologica*, suppl. Bd., fasc. **14–15**. Blankenburg.

SITOWSKI, L., 1928, See *Rev. appl. Ent.* (A) **16** : 236–237. (Parasites of *Dendrolimus pini* L. and *Lymantria norucha* L.) *Rocz. Nauk rol. lesn.* **19** : 12 pp.

THOMSON, C. G., 1887, *Opuscula entomologica*, Fasc. **11** : 1045–1182. Lund.
—— 1893, *ibid.*, fasc. **18** : 1889–1907. Lund.

TOWNES, H. K., 1944–5, A catalogue and reclassification of the Nearctic ICHNEUMONIDAE. I and II. *Mem. Amer. ent. Soc.* **11** (1–2) : 1–477, 478–925.

UCHIDA, T., 1933, Ueber die Schmarotzerhymenopteren von *Grapholitha molesta* Busck in Japan. *Insecta Matsumurana* **7** : 153–164, 5 figs. (1933, *Rev. appl. Ent.* (A) **21** : 548.)

VODINSKAYA, K. I., 1929, See *Rev. appl. Ent.* (A) **17** : 141–2. (On the biology and ecology of *Hylemyia brassicae* Bchd. and *H. fluralis* Fall.) *Izv. Otd. prikl. Ent.* **3** : 229–49, 11 figs.

PUBLICATIONS

The Publications of the Royal Entomological Society are *Transactions* and *Proceedings*.

The *Transactions* form an annual volume, each paper in the volume being issued as a separate part. The parts are issued irregularly throughout the year.

The *Proceedings* are issued in three series :

Series A. General Entomology
Series B. Taxonomy
Series C. Journal of Meetings

Series A and B are issued in twelve parts, forming an annual volume of approximately 240 pages each.

The following information is supplied for the guidance of authors wishing to submit papers for publication in any of the Society's journals.

INTRODUCTORY

The Society is prepared to undertake the provision of a reasonable number of text figures. The original drawings for such figures must be supplied by authors. Such drawings or groups of drawings must be drawn to a scale which will permit of their reduction to an area of dimensions not exceeding $7\frac{1}{2}$ by $4\frac{1}{2}$ in. In the case of the *Proceedings Series A* and *Series B*, authors may be required to pay for the necessary blocks for the provision of plates, half-tone and coloured work.

A uniform method is adopted for the citation of bibliographical references in the Society's publication as follows :

Smith, A., 1936, New Species of COCCIDAE. *Proc. R. ent. Soc. Lond.* (B) **6** : 301-306, pl. 1.

——, 1936, New species of COCCIDAE. *Trans. R. ent. Soc. Lond.* **84** : 901-936.

Titles of periodicals cited are to be abbreviated in the manner indicated in the *World List of Scientific Periodicals, 2nd edition*, 1934.

Authors are entitled to receive 25 copies of their papers free of charge and may purchase additional copies provided that request be made before publication.

Papers offered for publication should be sent to the Hon. Secretary, Royal Entomological Society of London, at 41, *Queen's Gate, London, S.W.* 7, and must be typewritten on one side of the paper only. Sufficient space must also be left between the lines for editorial corrections.

The copyright of the Society's publications is vested in the Society.

TRANSACTIONS

Papers offered for publication in the *Transactions* are considered by the Publication Committee of the Society, which meets usually in the months of May and November. In order that papers may be considered at these meetings it is necessary for the manuscript and drawings for illustrations to be in the hands of the Hon. Secretary fourteen days before the meeting of the Committee.

Papers of less than eight printed pages (approximately 7,000 words) will not normally be accepted for the *Transactions*, and papers by authors who are not Fellows of the Society must be communicated by a Fellow.

PROCEEDINGS SERIES A AND SERIES B

Papers submitted for publication in either *Series A* or *Series B* of the *Proceedings* by authors who are not Fellows of the Society may be accepted if they are communicated by a Fellow. Preference will be given to papers written in the English language, and papers of more than eight printed pages (7,000 words) will not normally be accepted for publication in these journals.

PROCEEDINGS SERIES C

Series C is issued prior to every General Meeting. It contains abstracts of exhibits to be shown and communications to be made, together with the titles of papers accepted for publication.

The annual subscription to *Series A. General Entomology* is £2 0*s.* 0*d.* ; *Series B. Taxonomy*, £2 0*s.* 0*d.* (single parts 4*s.* 0*d.*); and *Series C. Journals of Meetings*, 6*s.* 0*d.*

As from January, 1936, the journal *Stylops* is continued as *Proceedings Series B. Taxonomy*. Copies of volumes 1-4 are available at £1 16*s.* 0*d.* each, post free.

MEETINGS

TO BE HELD IN THE SOCIETY'S ROOMS

41, Queen's Gate, S.W. 7

1949

Wednesday, March 2

„ April 6

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

The Fellowship and Fees

Fellows pay an Admission Fee of £2 2*s*. The Annual Contribution £3 3*s*. is due on the first day of January in each year, and is payable in advance. Fellows under the age of 25 years may pay the entrance fee in two equal annual instalments.

Fees should be paid to the Hon. Treasurer, at 41, Queen's Gate, S.W. 7, and *not to the Hon. Secretary.*

Fellows desiring to pay their Annual Contribution through their bankers may obtain an official form of banker's order by applying to the Hon. Treasurer.

Fellows whose Contributions for the current year have been paid are entitled to receive the *Transactions* and *Proceedings* of the Society free of charge. Further copies may be purchased at reduced prices by applying to the Hon. Secretary.

Forms of application for Fellowship, copies of the Bye-Laws and the List of Fellows may be obtained from the Hon. Secretary.

Meetings and Exhibitions

Fellows and others wishing to make a communication to a General Meeting of the Society are requested to send in their names the title of their exhibit, and a short abstract of their remarks, to the Hon. Secretary fourteen days before the meeting at which it is proposed to make the communication. Should it be desirable to publish a fuller account of the communication the manuscript may be submitted for publication in *Proceedings Series A* or *Series B*. If the epidiascope is required, 24 hours' notice must be given. Objects for projection should not exceed 6 in. by 6 in.

Fellows resident abroad, or otherwise unable to attend meetings, are reminded that notes or observations sent to the Hon. Secretary may be communicated to a General Meeting on their behalf.

PRINTED FOR THE SOCIETY BY ADLARD AND SON, LTD., BARTHOLOMEW PRESS, DORKING